STEAM COMMUNICATION

WITH

INDIA

BY THE RED SEA;

ADVOCATED IN

A LETTER

TO

THE RIGHT HONOURABLE

LORD VISCOUNT MELBOURNE,

ILLUSTRATED BY

PLANS OF THE ROUTE, AND CHARTS OF THE
PRINCIPAL STATIONS.

◆

BY

DIONYSIUS LARDNER, LL.D. F.R.S.

> *Resolved*,—That it is expedient that measures should be immediately taken for the reg establishment of steam communication with India by the Red Sea.
>
> *Resolved*,—That the net charge of the establishment should be divided equally between His Majesty's Government and the East India Company.
>
> *Report of Select Committee of the House of Commons, July*, 1834.

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NOTICE.

STEAM COMMUNICATION
FROM
CALCUTTA. MADRAS AND CEYLON,
TO
ENGLAND.

THE Committee of the New Bengal Steam Fund are desirous of ascertaining the degree of support which may eventually be obtained throughout India to a well organized, properly estimated, Plan for establishing the above communication, in the event of the result of the inquiry in progress in June last, before a select Committee of the House of Commons, not leading to the Establishment of the desired Communication direct to the three Presidencies.

It is estimated at home that a Capital would be required of £3,50,000, and the present object is merely to ascertain what portion of that Capital might be calculated upon, as likely to be forthcoming from India, on such a well organized and properly estimated plan being promulgated. It is proposed that the Capital be divided into

7,000 shares of £50 or Co.'s Rupees 500 each, to be payable 100 Rs. per Quarter till the whole is paid; that a Charter be obtained exempting all from liability beyond their share, and an act authorizing all who by the Indian acts are prevented from trading to become parties to this scheme.

As the immediate object is solely to ascertain the degree of support which a scheme based on sure Grounds would receive in India, it is scarcely necessary to enter into any present detail to show that such a scheme can be made to pay; especially as parties notifying their willingness to take shares will not in the most distant degree become pledged so to do, if the Scheme should be matured and promulgated, although their so doing will entitle them to priority of claim to shares if it should when promulgated become popular.

It may not however be irrelevant to state that Dr. Lardner, than whom no better authority can be given, considers that a well arranged steam communication between England and all the Ports of India would realize from passengers alone £196,000. However, as before said, no party will be bound by any present expressed intention of taking shares, though priority of claim will be conferred thereby; and it being of essential consequence that the Committee should be enabled as early as possible to communicate to parties at home the degree of support which such a scheme would be likely to receive in India, they will feel much obliged by intimation being made to their Secretary by Individuals quoting the number of shares they might be disposed to take.

Parties now precluded by law from trading may of course, with reference to the condition referred to in their case, in like manner communicate their conditional desire.

As the time of departure would be arranged so as to form an intermediate despatch from India between the departure of the Hon'ble Company's Steamer from Bombay, it is not unlikely that a small Steamer may be established between Bombay and Socotra; thus not only affording additional means to that presidency of passage, but completing a regular mail every fortnight between India and England. Every part of India will then be equally interested in the communication, and it may fairly claim support from all.

Parties at Madras; desirous of putting their names down conditionally as above, are requested to communicate their wishes to John Barrow, Esq. the agent to the Committee.

The Committee having no Agent at Bombay, they will be obliged by communications being made to their Secretary, or to any House of Agency in Calcutta.

By order
of the Committee of the New
Bengal Steam Fund,
C. B. GREENLAW,
Secretary.

Town Hall,
The 2nd Sept. 1837.

CONTENTS.

PAGE

LETTER TO LORD MELBOURNE, ... 5

APPENDIX (A.). On the Route to India by the Euphrates, ... 73

APPENDIX (B.).

No. I. Circular published in Calcutta, April, 1836, ... 75

II. Calcutta Petition to the House of Commons, March 5, 1836, ... 78

III. Calcutta Memorial to the India Board, March 5, 1836, ... 81

IV. Letter to Lord William Cavendish Bentinck, March 31, 1836, ... 88

V. Memorial of the Inhabitants of Madras to the Court of Directors, of the East India Company, March 26, 1836, ... 91

VI. Report of Madras Steam Meeting, March, 1836, ... 94

VII. Madras Steam Petition to the House of Commons, ... 97

VIII. Reply of the Bengal Committee to Major Head, Chairman of the Provincial Committee for establishing a Steam Communication between England and India by way of the Red Sea, Dec. 26, 1836, ... 99

APPENDIX (C.). On the Steam Navigation of the Ganges, ... 108

APPENDIX (D.). On the Island of Socotra, . 110

APPENDIX (E.). Of the Head of the Maldives, ... 115

APPENDIX (F.). On the Administration of French Steamers in the Mediterranean, ... 120

MAPS, PLANS, &c.

TO FACE PAGE

Route of Steam Ships, between Great Britain and the East, ... 1
Chart of the island of Camaran, ... 26
Map of the island of Socotra, ... 28
Plan of the Route from Alexandria to Suez, ... 36
Plan of the Route from Kennah to Kosseir, ... 38
Chart of the Head of the Maldives, ... 52

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A LETTER,

&c.

My Lord,

Nearly three years have elapsed since a select committee of the House of Commons, after receiving a voluminous mass of evidence, declared in their report, " that, steam navigation between Bombay and Suez having in five successive seasons been brought to the test of experiment, it was expedient that measures be immediately taken for the regular establishment of steam communication with India by the Red Sea, the expence of the establishment to be shared equally by the East India Company and his Majesty's Government; that steam communication with India by the Persian Gulf and the Euphrates was *not* brought to the test of experiment; that it was desirable it should be brought to such test, and that a grant of 20,000*l.* be made by Parliament for that purpose."

Of these two suggestions of the select committee, the latter alone has been acted upon by government; the untried route has been brought to the desired test,—the experiment has been made, and the result has not been satisfactory*. Meanwhile the leading recommendation of the committee, that immediate measures should be taken for the regular establishment of steam communication with India by the Red Sea,—that route having been repeatedly and successfully tried,—has been suffered to remain a dead letter.

From the beginning the great body of the commercial community in the East was averse from the route by the Euphrates. From their local knowledge they were impressed with the persuasion that such an experiment could not be attended with permanent success. But even were such a course practicable, they felt that it would not attain those purposes which such an establishment should fulfil. Nevertheless the result of that experiment has been patiently awaited, an anxious solicitude being entertained that in the meanwhile measures would be taken to establish that line of communication of the practicability of which the committee did not express, and in fact could not entertain, any doubt. Although, in the long interval which has elapsed, they observed month after month and year after year to roll on, and his Majesty's government still passive, they have been most reluctant to believe that it was intended to disregard the recommendation of parliament, and to leave the means of intercommunication with the East in the same state in which the early enterprise of the Portuguese had placed them.

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* See Appendix (A.).

They feel now, however, that they ought not to continue longer silent sufferers from this state of inaction or neglect. They feel that it is due, not to India only, but to Great Britain itself, to urge by all the means within their power the immediate realization of the recommendation of the parliamentary committee of 1834, by "the establishment of a regular line of steam communication with India by way of the Red Sea."

In addressing your Lordship on this subject, I do not presume to think that personally I have any title to expect your attention. But when I assure your Lordship that the measure which I now advocate is the object of the most anxious wishes of the whole mercantile community of India, I feel that I have a claim to your attention which you will not overlook, and that claim will not be rendered less strong by the consideration, that those sentiments and wishes are shared by the whole population of India, native as well as British.

There are some measures which government will adopt only when the feeling of those to be affected by them is strongly expressed in their favour. If the present be one of them, abundant manifestation of the sentiments of the people of the East, as well as of those at home who are connected with India, has been furnished. For thirteen years has the commercial community of Calcutta supplicated for this improvement; and extensive subscriptions have been raised in aid of it, to which native princes and merchants have liberally contributed in common with our own fellow subjects*.

It is impossible even for a moment to contemplate this measure without being impressed with the number, variety, and magnitude of the advantages which would arise from it. Our empire in the East contains one hundred millions of souls, the subjects and dependent allies of Great Britain. By the present means of communication, their distance from us is not less than two thirds of the circumference of the globe. By the proposed measure that distance would be reduced to less than one third of its present amount: a virtual change of geographical position would be effected.

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* See Appendix (B.).

A commerce amounting (exclusive of the China trade), to nine millions annually, would receive that stimulus which commerce always receives from increased facility of communication. A correspondence, the daily amount of which (exclusive of larger despatches), is, even under the disadvantage of being carried round more than half the globe, not less than a thousand letters, would be expedited and proportionately augmented. An army of three hundred thousand men in British pay, now removed beyond those limits which admit of that communication with home which is necessary for the due maintenance of discipline, would be brought under the beneficial influence and immediate control of the home government.

But great as these advantages may be, they are not the most important national results which would ensue from the proposed measure. The same means by which correspondence with the East would be expedited, will also afford equally increased facilities for personal intercourse. A voyage of several months, exposed to all the dangers of the Southern Ocean, and to the inclemencies of protracted tropical navigation, is a barrier to personal intercourse between distant people, which will be overcome only in cases of extreme need. But when the road to India lies along the shores of Europe, over the quiet waters of the Mediterranean, and amid the splendid monuments of antiquity which adorn Egypt; and when, withal, the time of the passage shall be almost reduced from months to weeks; great indeed would be the comparative extent of personal intercourse which must ensue. That every increased expedition and facility given to the transport of passengers is followed by a more than proportionally increased amount of intercourse, is a fact so generally established that it may be considered as assuming the character of a distinct statistical law. The effect produced by the establishment of steamers between various points on the coasts of these countries, as well as between this country and different parts of the continent, may be adduced as an example of this. But by far the most remarkable instances are those afforded by the effects of railway communication, compared with the previous communication upon turnpike roads. In every case, without a single exception, where a railway has been constructed between two distant places, the intercourse in passengers has increased in a proportion of not less than four to one; nor can this be ascribed to the reduced cost of transport alone, since in cases where the cost has been increased the same increase of intercourse has taken place. It is, in fact, ascribable to the inducement which increased expedition presents to persons who would otherwise attain their object by correspondents and agents. If, then, analogy derived from unvaried experience be of any value, and if inferences from it be justifiable, I would here be entitled to assume not only that all those who now pass between this country and India by the route of the Cape would, on the establishment of steam communication by the Red Sea, adopt the latter route, but that vast numbers who now never attempt the voyage at all would perform it; that an enormously increased number of persons would pass between the two countries; that the wealthy and enlightened classes of the native population of India would visit this country, and that a reciprocal desire would be manifested among ourselves to visit the East. Much of what is now transacted in each country by correspondence would be then transacted personally; and that diffusion of knowledge, and that spread of liberal principles would ensue, which always attend the intercourse of a less with a more civilized people.

These are topics which it might be expedient to enlarge upon were it my purpose merely to excite public feeling in favour of the measure. In addressing your Lordship the slightest allusion to them is sufficient.

If we except the recent application of the steam engine to the transport of passengers on railways, there is none of the numerous ways in which that machine has ministered to the uses of the human race which has undergone a more steady and rapid course of improvement than its application to the propulsion of vessels over the sea. There are even now in a progressive state several important improvements, by which its efficiency in navigation will be materially augmented; and if the committee of 1834, from the evidence then laid before them, and from the fact of voyages being made by the Hugh Lindsay during five successive seasons, saw reason to be satisfied of the practicability of the measure, how much more forcibly would they *now* impress their recommendation on government having before them the extended and improved state of the art of steam navigation, and the fact that the voyages by steam between India and Egypt have continued to be successfully made, under the disadvantages of inadequate vessels and defective arrangements at the necessary stations and depôts.

Nothing, but that state of passive acquiescence generated by a long habit of following a certain course, could reconcile a people so commercial and so locomotive as the English, to be confined to the route to India by the Cape, since the art of transport by land and water has received those astonishing accessions which have been recently conferred upon it by the steam engine. The distance from Falmouth to the nearest port of India by the Mediterranean and the Red Sea is 5800 miles, of which there are not 200 miles of land, and that through the dominions of a friendly power. The distance usually traversed by sailing vessels in the voyage by the Cape is about 16,000 miles. How strong must be the force of habit, which reconciles us to such a circuit to reach a place not 6000 miles distant!—How over-ruling must that necessity be which sends persons and correspondence a voyage equal to two-thirds of the circumference of the globe, to carry them less than one-fourth of that space! *Primâ facie*, then, my Lord, the question is, not why persons and correspondence should be sent direct to India by the Red Sea, but, why for such a purpose the present preposterously circuitous route should be still persevered in.

In order to place in a clear light the practicability of establishing a regular and permanent line of steam communication with India by the Red Sea, and to explain the arrangements which will best contribute to attain the object sought by the great bulk of the commercial community, it will be necessary to consider the relative position, the comparative commerce, the amount of correspondence, and extent of personal intercourse with the different points in India with which a communication with this country is at present maintained. These points are,—

First—The chief presidency and the seat of the supreme government, CALCUTTA, situate at the northernmost point of the eastern coast of India.

Secondly.—MADRAS, situated also on the eastern coast, 765 miles south of Calcutta.

Thirdly.—BOMBAY, situated on the western coast, in a direction nearly due east from the southernmost part of the Red Sea, and therefore the nearest port of India by that route. And

Fourthly.—The Island of Ceylon, situated south of the most southern point of India.

Of these, by far the largest amount of intercourse of every kind is maintained, as may naturally be expected, with Calcutta. Of 309,000 letters, which pass annually through the post office between Great Britain and India (including Ceylon), 170,000 are with Calcutta, 71,000 with Madras, 54,000 with Bombay, and 12,500 with Ceylon. Of about 3,200 passengers annually between Great Britain and India, about 1,450 are with Calcutta, 1,050 with Madras, 600 with Bombay, and 100 with Ceylon. Estimating the commerce at nine millions annually, the amount with Calcutta may be taken at five millions and a half, with Bombay two millions and a half, and with Madras one million.

These results may therefore be fairly assumed to represent the exigencies of the different ports of India for the improved means of communication with this country now proposed.

As in Europe, and more especially in Great Britain, the transport of persons and despatches can generally be effected with greater expedition by land than by sea, it might be inferred that the most effectual arrangement by which the desired ends could be attained would be to establish a line of steamers communicating with Bombay, that being the best harbour in India, and the nearest port to the Red Sea. As such an arrangement has been already contemplated and would necessarily and justly be countenanced and approved by all parties unacquainted with the peculiar circumstances attending inland travelling in India, it will be necessary here to lay before your Lordship the objections to it. Indeed, I feel that I may distinctly and emphatically assure your Lordship, that such an arrangement would be regarded by the whole mercantile community, save the limited number whose interests are confined to the particular port of Bombay, with feelings of the most unmixed concern and disappointment*.

Nothing can be more defective than the means of internal communication by land carriage in India. The country is scantily intersected by roads, and the few which exist are of the very worst description. Neither is there any ground for hoping that future improvement will remove this defect. The climate opposes so many and serious obstructions to land travelling, that even if good roads were constructed little increase of intercourse by them could be expected. At one season, the periodical rains would totally obstruct travelling; and at another, the intolerable heat would render it impossible, except at night. These are difficulties which neither art nor wealth can remove or mitigate, and which will always give the preference to transport by sea.

The only inland communication which now exists between the presidency of Bombay and the eastern presidencies of Calcutta and Madras, is by the Dâk, or foot post. Single letters or light despatches may be thus transmitted, subject to the many causes of uncertainty and insecurity arising from their transit through the territories of various native powers not under the direct control of the British Government or the India Company. The time of the Dâk between Calcutta and Bombay is thirteen days. Now I shall presently show that the time from the Red Sea to Calcutta for correspondence by this route would be greater than by a line of steamers touching at Ceylon and Madras; with this further difference, that while single letters or light despatches only could be transmitted by the Dâk, and even these subject to insecurity and a heavy inland postage, all correspondence, passengers, and even certain descriptions of merchandise, could be transmitted by the steamers.

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* See Documents in Appendix (B.), especially the letter of Mr. Greenlaw to Major Head, marked No. IX.

On the other hand, to send the correspondence of Bombay to Calcutta would be as inconvenient and absurd as to send the commercial communications of the great majority of East Indian merchants to Bombay, the port of India most remote and inaccessible to them. If the line of improved communication be established at all, let it be carried to all these ports, which, as I shall prove, there can be no difficulty in accomplishing It was a principle adopted by the India company, and by the parliamentary committee, when this question was under discussion in 1834, that "if the measure were undertaken, it ought to be executed on a large "and efficient scale; and that between doing it "efficiently and not doing it at all, there is no "advisable medium." In this principle the mercantile body of the East most cordially concurs.

But, even if Calcutta were not, as it is, the place of greatest commerce and correspondence as well as the seat of supreme government, its position would render it a point to which the extension of the line of steam communication would be attended with the greatest advantages to the interior of the country. Calcutta is situate at the mouths of the GANGES, the finest and most extensive inland water route in India. The steamers which have been for some years established on this river, communicate with the interior at present as far as Allahabad, and are intended eventually to be carried to Agra, being more than a thousand miles of uninterrupted inland navigation. On the banks of the Ganges between Calcutta and Agra are numerous places, from which convenient communications with the interior will be established*.

While the communication with the interior westward from Calcutta is thus maintained upon the Ganges, an equally easy and certain means of communication by river steamers may be made northwards on the Burhampooter, extending nearly to the frontiers of China, and intersecting the country of Assam, where the cultivation of the tea-plant has been recently introduced.

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* See Appendix (C.) on the navigation of the Ganges.

No means of inland water communication of any extent is presented on the western coast of India. The mouths of the Indus are at the northernmost point of the coast near the frontiers of Persia. This river would be navigable for steamers, and, if a communication were established by steam-vessels between Hyderabad and the Red Sea, the waters of the Indus would afford means for continuing the line of steam communication to the northern provinces, and to the Persian provinces of Beloochistan, and Afghanistan, as well to Penjab, Cachmere, &c.

British interests in India, as well as that part of our commercial interest at home which is connected with the East, require, then, that this great benefit should at once be extended to ALL INDIA: that not one part only, but all the three presidencies and the Island of Ceylon shall be included in the arrangement. To do less would be in every point of view inexpedient, even on the score of economy. The cost of establishing and maintaining such a means of communication with Bombay alone would be inconsiderably increased by extending it to Madras and Calcutta, while the benefit so partial a measure would confer upon the latter would be little felt.

To determine the most advantageous arrangement by which a general communication may be established; it is necessary to consider how the entire route, between the northernmost part of the Red Sea, and the several points on the coast of India already mentioned, may be resolved into stages of convenient lengths, and how and where depôts for fuel and proper works for the maintenance and repair of machinery can be established. The most extensive line of steam navigation, of which we have yet had any lengthened experience, is that of the Admiralty packets, which for several years have maintained a regular communication between this country and the Ionian Isles, Egypt, and occasionally Syria. The stages of this line have been—first from Falmouth to Gibraltar 1,010 miles*; secondly, from Gibraltar to Malta 970 miles; thirdly, Malta to Corfu 550 miles; or Malta to Alexandria 860 miles. So far as Alexandria, then, here is a voyage of about 2,800 miles performed with certainty and regularity for a long continuance.

In the arrangement of the succession of stages of a long sea voyage by steam, the first object should be to see that the longest stage shall not exceed that distance for which a steam-ship shall be able to carry sufficient fuel, under the most adverse circumstances of wind and weather. It is probable that a well-constructed vessel furnished with the very best machinery, could carry fuel sufficient for a stage of about 2,500 miles in average weather; but under more adverse circumstances she would probably exhaust her fuel by a passage of less than 2,000 miles. But, besides the consideration of fuel, there are other circumstances to which regard must be had. It is found that the machinery of a steamer requires, after moderate intervals, to be examined and re-adjusted; the fire-places and flues to be swept and scraped; the boilers to be discharged of their contents, and well cleansed both internally and externally. If this process be omitted, or only observed after protracted intervals of uninterrupted work, the machinery will not only be quickly destroyed, but even while it lasts the performance of the vessel will be inefficient; her speed will be diminished, her consumption of fuel will be augmented, and that portion of the fuel which fails to propel her will be actively engaged in working her destruction. In a word, a steam-engine, like an animal, requires regular repose at reasonable intervals; of which being deprived, it ceases to be capable of useful labour. Although, therefore, a stage of from 200 to 2,500 miles be *practicable*, it is not *advisable;* and arrangements should be made, if possible, that the

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* In expressing distances, I use invariably nautical or geographical rules.

A dâk bungalow of the largest size is being completed at Dhurmpore, where the roads to Kalka, Kussowlee, Dugshai, and Subathoo diverge.

21. It may be satisfactory to show here the probabilities of the financial success of a carriage-road from the plains to Simlah, or in other words the probability of the scheme being a remunerative one.

In the first place, the distance by this new road from the plains to Simlah is 56 miles, which, upon the opening of the tunnel and the completion of other improvements, will be reduced to 50 miles. The distance by the old road, (which is practicable only for porters and lightly laden beasts of burden,) is 42 miles. The present ascertained traffic is above 8,000 tons per annum, without calculating the occasional increase consequent on the presence of the Head Quarters of the Government at Simlah.

The average cost of transit is Company's Rupees 50 per ton; the total annual cost is not probably less than 4½ lakhs of Rupees. When the new road is fairly opened for carts, this traffic will be doubled, as the potatoe grounds of Mahasoo will as easily supply 9,000 tons of potatoes as they now supply so many cwts. The iron of Kotkhai and Shiel may be produced ten-fold beyond the quantity now exported, which is 5,000 cwts. The Deodar forests of the Putteealah and Keunthul States may as well furnish timber for the buildings of Umballah, as for those of Kussowlee and Dugshai. Simlah will become the entrepôt of Hill produce instead of Loodianah and Sirhind, and when Railways intersect India, it will be the summer residence of the European public of the Presidency.

Whether the Government retain the transit in their own hands, issue licenses, or establish tolls, the Annual Returns ought not to be less than 15 per cent upon the outlay.

But Dugshai and Subathoo have yet to be taken into account. The annual cost of transmitting Commissariat Stores to these Stations is not less than Company's Rupees 10,000. A saving of 50 per cent. upon this will at once be the consequence of the establishment of carriage traffic.

The present average cost of marching a Regiment from Kalka to either of these Stations is Company's Rupees 2,000-0-0.

The cost of the same by means of carts will be less than Company's Rupees 500-0-0. The outlay at present upon the transit of market goods, and private stores, is not probably less than two lakhs of Rupees.

It has been stated by some that the annual repairs of this road will be enormous. This opinion is proved to be erroneous, by the fact that the roads hitherto constructed are at this present moment in as good condition as they ever were, and the total amount expended in three years, on the repairs of 78 miles, has been Company's Rupees 8,312-15-5, or Rupees 35-8-5 per mile per annum. As the traffic increases it will probably be necessary to metal certain portions of the line, but it is to be supposed that the increased traffic will afford increased income.

But far above and beyond these considerations is the opening out of the fertile valleys of these mountains to future European colonists. Blessed with a climate not surpassed in Europe; possessed of a soil which requires but the labor of man to produce any thing; pregnant with minerals of unknown value and extent; abounding in virgin forests, the depths of which have not yet heard the sound of the woodman's axe; all and far more than the early colonists of America ever promised themselves is to be found here, where, under the blessings of a mild and paternal Government, the colonist might increase his store, as fully assured of safety to life and property, as if the scene were in the heart of Great Britain, instead of under the shadows of the mighty Himalayas. Instead of permitting the old worn out European pensioner to idle away all that is left to him of life, under the scorching sun of Chunar, it might be worthy the attention of Government to give him a cottage and a spot that he might call his own, within some of these elevated valleys, where, with something to occupy his time, he might, under proper superintendence, lay the foundation of an European colony, the youth of which, educated to a military life in the neighbouring "Lawrence Asylum" and "Roorkee College," might furnish our Indian Army with recruits as strong, and better educated and acclimated, than the mother-country produces.

22. I will now proceed to show what *progress* has been made on the works to the North of Simlah on the line towards Thibet, and should objection be taken to it, I beg that it may be borne in mind that in the Himalayan *working* year there are not above 190 days.

From the end of November to the end of March, it would be fatal to the laborers to be encamped at elevations above 6,000 feet, and again during the wet season, there are many days when work must be deferred. Add to this the great natural difficulties to be encountered, the limited amount of laborers that are procurable from the Northern

States, the fact that these are changed every fifteen days, thereby entailing on the Road Overseers a continual and most harassing amount of training, the benefits of which they are never destined to reap, and the frequent desertions of entire working parties at perhaps most critical times, and the wonder will not be how little has been accomplished but rather that any thing has been effected at all. With the exception of two breaks of 2 and 3 miles respectively, 115 miles of 6-feet road are completed.

In this there is one abnormal portion temporarily admitted, in order to avoid the tremendous cliffs which line the Nogurree torrent. A few general improvements are required, but the whole is practicable for laden mules and horsemen. At present the working parties are pushed forward to Wangtoo on the Sutledge, where I hope they will be able to continue at work during the winter, and by next spring I expect that but 25 miles will remain of unfinished work between Simlah and Chini, and 60 between Simlah and the frontiers of China.

23. Where *all* is so difficult, it appears scarcely necessary to particularize special works. There are a few however which I will briefly notice. A tunnel 560 feet in length has been driven through a hill 2½ miles North of Simlah and not the least remarkable circumstance connected with this work is that it was constructed almost entirely by convict labor. The night reliefs were alone composed of free laborers, and a few of the same class assisted during the day in wheeling barrows and in such works as the convicts' chains rendered irksome. In the excavation of this work 10,000 convicts* and 8,450 free laborers were employed. At the market rate of labor, it would have cost Company's Rupees 1,057-0-0, but as a certain amount was furnished as *tribute*, it only cost Company's Rupees 391-0-0. A further sum of Company's Rupees 220-0-0 was expended on artificers, so that the total cost of the tunnel to Government was Company's Rupees 611-0-0. The period occupied in its construction was twelve months. Considering the valuable work thus obtained from convict labor, I cannot refrain from expressing my disappointment that since the completion of this tunnel, I have been wholly deprived of the services of the few prisoners that were employed on it.

The next heavy works are at the cl[illegible] [illegible]r Phagoo, which have been cut down to a depth of 120 feet.

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* *See* Note, p. 15.

Between Theog and Mutteeanah three strong and handsome viaducts have been erected. One of these is 2[illegible] feet in length. Beyond Mutteeanah the tremendous range of cliffs, which extend at intervals over a mile and a half, have been cut down to the depth of 130 feet, so that a 10-foot road now runs through this range of precipices where formerly a goat could not have found standing room. From Bowlee to Thedah the road is carried for 5 miles through one continuous range of cliffs. Before reaching Serahun it passes through the fearful precipices that overhang the Munglad, and beyond Serahun it is cut for half-a-mile through a sheer mass of rock.

The number of laborers employed upon these works has been 8,83,564,* the cost of which, after deducting Company's Rupees 40,000-0-0, as stated in paragraph 17 to have been subscribed by four States, has been Company's Rupees 77,685-0-0 or Company's Rupees 706-3-7 per mile. The expenditure on material, with the exception of powder, has been trifling; of this, 60,000 pounds have been expended. Eight staging bungalows have been erected at a cost to the State of Company's Rupees 9,990-5-7.

24. A few remarks upon the material used in the construction of the road works, and found in the neighbourhood of the line, do not appear to be irrelevant to the subject of this Report; and first with reference to *building timber.*

It appears to be a normal condition of the Himalayan forests that they shall have a Northern aspect, the flanks of the mountains facing that quarter being alone covered with tree vegetation. So much is this the case that a traveller from the Southward is at first impressed with the barren appearance of the mountains and the utter absence of forest scenery. When, however, he has penetrated further into the interior and turns his face Southwards, he is made aware of the erroneousness of his first impression, by the extensive breadths of dark pine forests he finds he has passed. To account for this singular fact, several reasons may be adduced, although none appear wholly satisfactory. It may be from the accumulation of snow on the Northern flanks during the winter, which protects the young plants from the severe frosts, and affords an inexhaustible supply of moisture during the summer, or perhaps from the general dip of the strata being towards the South, from which those slopes have an even and regular declination, but retain no depth of soil, from the facility with which it is washed off, whereas, from the disintegration of the Northern exposed edges, deep deposits accumulate receiving yearly increase in depth and richness from the debris of decayed vegetation. So rich does this soil become, that at elevations between 8 and 12,000 feet, some of the most delicate of European vegetables and flowers are naturally produced. Asparagus, celery, rhubarb, strawberries, gooseberries, raspberries, *scented* violets, primroses, potentillas, anemones, cowslips, are all plentiful.

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* *See* Note, p. 15.

From the Hindostan and Thibet Road following the left or South bank of the Sutledge, it necessarily passes through several extensive forests, but the majority of the trees furnish timber of little value except as fuel. The immense forest extending from the Shallee Peak in the Bujjie State, to Turandah in Kunawur, (a distance of at least 100 miles), does not contain one tree in a thousand capable of yielding good durable timber. Within this distance there are a few patches of Pinus deodar, than which there can be no finer timber, and at a lower elevation many strips of Pinus longifolia fit for deal boards and battens, but the mass of the forest is of Pinus excelsa and Abies Smythiana, the timber of which much resembles that of the spruce fir of Europe, and is of little use except for fuel. From Turandah upwards, the Pinus deodar becomes more abundant, and when approaching the arid uplands of Thibet, it, with the Pinus Gerardiana, (the *neoza* or edible pine,) forms the general tree vegetation.

Without stopping to notice the Deodar forests of the Putteealah, Keunthul and Kotee Chiefs within ten miles of Simlah, out of which have been built the Sanataria of Dugshai, Kussowlee, Subathoo, and Simlah, and which, from the short-sighted rapacity and negligence of the Chiefs, have been ruthlessly destroyed and not replanted.*

I shall briefly mention the position and extent of the other patches of deodar, which I before stated occur occasionally on the left bank of the Sutledge, before reaching the comparatively high point of Turandah on that river.

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* "I should here state that active measures for the regeneration of these forests "are now in progress under the zealous superintendence of Lord W. M. Hay, Superin-"tendent of Hill States, and that as many seedlings still exist, they may yet afford at a "future period valuable resources for timber to the Government."—*Vide Letter from Superintendent Hill Roads, dated 10th March* 1856.

Near the summit of the Shallee Peak, there are some eight hundred trees of large dimensions, growing at a general elevation of 5,000 feet above the Sutledge, and separated from it by 5 miles of a rough descent.

At Kotegurh there is a young healthy strip of forest, which however is not likely to prove more than sufficient for the local demand.

In several of the deep valleys between Kotegurh and the neighbourhood of the Loongree Pass, at Bowlee and at Dharun, all stages on the Hindostan and Thibet Road, there are several groves of deodar, but all of limited extent, and held sacred by the villagers as their household gods. These all exist at very long distances from the Sutledge.

Besides these patches there are of course many individual trees of deodar amongst the dense mass of inferior pines, but they are in no place sufficiently numerous to deserve special notice, and can only be discovered after considerable search. The same forests also produce walnut, maple, horse-chestnut, hazel, several cedars, and two oaks, *(quercus incana* and *quercus semicarpifolia.)* the timber of which is tough and durable. It is little used by the hill-men on account of the difficulty of working it, and the crooked nature of the tree rendering it not easily adaptable for building purposes. I consider this timber as peculiarly well adapted for railway sleepers, and carriage and waggon trucks. Appendix C gives the weight per cubic foot, and transverse strength of deodar, P. longifolia, and the two kinds of oak, as experimentally determined at various places on the road.

It is not until reaching Turandah that the deodar becomes sufficiently abundant within a moderate distance of the river, to suggest the possibility of floating the timber down to the plains. The rocky nature of the bed of the Sutledge within the hills, and the rapidity of its fall has until lately been held to render improbable the success of any attempt to float timber from a high elevation. But an experiment commenced by Mr. Edwards, and carried out by Lord William Hay, has proved the possibility of doing so, and although the result of the experiment was not satisfactory in a financial point of view, this was attributable to causes which I believe to be remediable.

The great fact of the possibility of floating timber of almost any dimensions, from a high elevation on the Sutledge to a point where rafts may be constructed, was proved. The following were the causes of the want of success in a pecuniary point of view :—

First.—The difficulty of transporting the timber from where it was felled to the river, in consequence of the precipitous nature of the country.

Second.—The perishable nature of the timber floated down, four-fifths of it being P. longifolia.

Third.—The unnecessary delay of two years in forwarding it to Ferozepore, arising from the timber having been cut too late to take advantage of the floods in the Sutledge, without which there was not sufficient water to float them down, and—

Fourth.—The want of a proper establishment at Belaspore, where the current becomes sufficiently easy to allow of rafts being formed.

The first of these difficulties, and the only one I consider necessary to notice, I would remove by the erection of a slide between the forest and the river. Turandah itself is not suitable for such an arrangement, as the forest is not sufficiently extensive and the ground between it and the river is too precipitous. The capabilities of Nachar, (the next stage,) are far greater. There are two forests in that neighbourhood, one to the south-east, consisting of 900 splendid trees, averaging in girth 9½ feet, and in height 115 feet. The maximum girth measured was 24 feet, the minimum 4 feet. Trees of greater dimensions exist, and even reach the enormous girth of 37 feet. The other forest is immediately above the village of Nachar and contains 20,000 sound trees, averaging in girth 8 feet, and in height 110. The direct distance of these forests from the river is 2,100 yards, the first 800 yards of which is at an average slope of 20°, the next 500 yards are at 22°, and the last 800, (down to the river's edge) vary from 35° to 40. I was apprehensive that these last gradients would prove too steep for the efficient working of a slide, but I have since constructed an experimental slide at an angle of 40° and found it to answer every requirement. The frequency and depth of the inflections render a diagonal line along the hill-side impossible. I now feel perfectly confident of the success of this scheme, which I recommended to Government in 1852. The probable cost of the erection of the slide would be 10,500 Rupees, and the Ferozepore value of the timber which might be *daily* sent down by it, from May to September, (whilst the river is flooded.) Rupees 3,000.

Three lakhs worth of the finest timber, of a scantling fit even for the Bombay market, might be *annually* supplied by such an arrangement during the next seven years. The selling price at Ferozepore for building timber of deodar is, twelve annas per cubic foot. I will warrant, should Government be pleased to approve of my suggestions, the delivery at that point on the Sutledge of any quantity of prime wood at four annas per cubic foot.

But before sending down timber to be used in the Punjaub, where it is exposed to the ravages of the white ants, I would recommend the precaution of rendering it impregnable to their attacks by the infusion of some antiseptic substance into the sap of the growing tree. Appendix D. gives the result of four experiments made by me during the past year, which, it will be seen, were entirely successful. Fifteen days*sufficed for the impregnation and destruction of the growing trees. They were felled, and on being sawn up, the sulphate of copper with which they had been destroyed was observed to have colored almost every portion of the timber. Four logs were sent to Captain Johnson, Assistant Quarter-Master-General at Umballah, who in the beginning of July had them buried with four unimpregnated logs in a spot swarming with white ants. They were dug up in November, having been four months under ground, when it was found that all the unimpregnated timber, with the exception of one log of deodar, was more or less destroyed, whilst the impregnated logs, with the exception of one in which the infusion had not penetrated the Alburnum, and which was consequently slightly excoriated by the insects, were in perfect condition. The fact of the infusion refusing to pass by the Alburnum is remarked by Lindley, ("Introduction to Botany," volume 2, page 326.)

The probable cost of thus insuring the durability of the timber will be half an anna per cubic foot, if impregnated with sulphate of copper and salt; or one anna, if with sulphate of zinc.

Before leaving this subject, I am desirous of pressing on the notice of Government the necessity for making arrangements for the purchase and preservation of the deodar forests of the Himalayas bordering the Sutledge, Pabur, and other rivers. These, with scarcely an exception, exist in independent States to which we accord protection. It is a remarkable fact, that more than one of the Chiefs of these States owe their positions to our generosity rather than to any right derived from birth, and yet there are no more rapacious dealers in any market, when they find that the Government are in want of any article they possess. Should Government direct a revision of their "Sunnuds," with a view to increase the tribute they pay, these Chiefs would represent their estates to be nearly worthless, but, if within their Chiefships, the Government should require a barren hill for a Sanatarium, the price demanded would be such as might be asked were the ground as productive as the wheat fields of Kent.

The forests of the *far* Himalayas are profitless to the Chiefs and consequently neglected. The natural grasses underneath are of more value to the villagers of the neighbourhood than the tall pines above, which shade them and check their growth. Fire strengthens the grass and removes the offending giant trees, and thus whole forests fall before the improvident brand of the hill-man.

The Nachar forest shows a belt of dry sticks and blackened stumps, 500 feet wide and 2,000 feet long, where, but a few years back, existed some 3,000 noble deodars. But let a Government Official express a wish for but *one* tree, and the price demanded would be such as to startle the most uncompromising advocate of "free trade." Far in the interior of one of these States I lately required for the public service a few trees of P. excelsa from a very extensive forest, to make charcoal, and although the timber of this tree is absolutely worthless, the price demanded was equivalent to that obtained in Simlah for the best deodar. I observe as one of the causes of the pecuniary failure of Mr. Edwards' scheme for floating down timber, that the Rajah of Bussahir charged Government two Rupees per tree for the common P. longifolia cut in the virgin forests of Kunawur, which, even in the neighbourhood of the Simlah market, would not have been worth half that price.

Were Government now pleased to express a desire to cut timber in the Nachar forests, I feel confident that however worthless they are at present to the Rajah of Bussahir, the sum he would demand would be almost prohibitory, as far as the success of the scheme financially is considered. I would therefore earnestly solicit permission to ascertain *accurately* the extent and value of the best deodar forests on either side of the Sutledge and Pabur, and *at once* arrange with the Chiefs the purchase of a certain portion of them, (say, as much as Rupees 50,000,) at a fair valuation. The forests having once become the property of Government should be properly guarded, and means for their extension adopted. The planting of the hill side, above and below the Hindostan and Thibet road, with fine timber trees is another part of the same project which may be thought worthy of the attention of Government.

27. I will now briefly describe the iron ore exposed by the road excavations, or lying in the vicinity of its course.

It is first met with near Kundrelah close to where the two great spurs of Simlah and the Chor bifurcate, and it extends at intervals over 200 square-miles of the latter spur. The species is " magnetic iron" and it occurs in very dark iron-black grains disseminated in veins throughout the mica schist. I believe it to be similar in its external, physical, and chemical characters, to the magnetic iron ore of Norway and Sweden. In two districts, Kotkhai and Shiel, it has long been worked by the hill-men, and from its malleability is much prized in the Indian market.

Near Kundrelah, where the Hindostan and Thibet Road lays open the mineral, the ore enters too intimately into the composition of the compact mica slate, in which it occurs, and bears too small a proportion to the matrix, to afford a profitable return ; but nine miles to the eastward and close to the Pabur river, the entire side of a mountain, rising 1,500 feet from the valley below, and reaching an elevation of 7,000 feet above the level of the sea, was found to contain numerous rich veins of magnetic ore disseminated amongst the mica schist which was here of the most friable nature. A land-slip on one face of the hill afforded the inhabitants of the neighbouring villages the means of procuring the ore without the expense of excavating.

So disintegrated are the particles of ore, that on a stream of water being brought over the mineral veins, the shale is washed off and the ore as a coarse granular black powder remains. The expense of procuring the ore in this state does not exceed three annas per cwt. The percentage of iron obtainable from it is 52·17.

Having obtained a grant of 5,000 Rupees for the experimental working of these mines, a locality was selected where ore, wood, water, and flux, were obtainable at the least practicable cost. Ore was excavated with the sanction of the Rajah of Bussahir, on a condition that he should receive a percentage, (hereafter to be fixed,) upon the iron produced from the furnace.

The sole right of cutting wood over eighty acres of fine forest in the neighbourhood of the mines, I obtained from the villagers of Shiel, on favorable terms. With proper coalings the yield of charcoal from this forest should not be less than 7,000 tons, but within a circle of ten miles there are forests capable of yielding as many millions of tons.

A strong stream of water flowed through the valley, at an elevation which admitted of a portion being led to the mines, by a cut, one mile and a half in length. With proper management power sufficient to drive machinery. may be so obtained. Lime, as a flux, was obtained for the carriage within a distance of three miles.

The result of the last few months' working has been the construction of the water-course, the erection of necessary store-houses and work-shops, the completion of one blast furnace, and the semi-completion of two others, on European principles, with several of Native construction, the washing and storing 170 tons of ore, and the burning and storing of a large quantity of charcoal.

The estimated cost at which (if working on an extended scale.) we can turn out iron, is 35 Rupees per ton, but by the introduction of machinery, the air-furnace, or better still, the hot blast, I feel confident that the Himalayan iron-works of Shiel might be brought to produce iron at the same rates as those of Merthyr-Tydvil and Glasgow, of a superior quality. I have hitherto received practical assistance in the direction of the works from Assistant Overseer Neilson, a son of the large iron-founder of Glasgow, but illness has deprived me of his services and until I can obtain a qualified person to conduct the European mode of smelting the ore, the yield will be but small and precarious.

I have marked upon the map the situation of the iron mines and would direct the attention of Government to their favorable position, with reference to the navigation of the Tonse, which, for six months of the year, I am inclined to think would prove no impossibility for flat-bottom barges.

28. The system of accounts which obtains on all works connected with the Hindostan and Thibet Road, from its efficient working during five years is deserving of notice in this Report. It is based on a system of checks, which, if the Superintendent of Works does his duty, affords the best security against fraud. It has proved successful with fifteen different works in hand, and I am confident would do the same with five times that number, and with any amount of expenditure. That it has been successful is owing to the separation in all details of the Accountant's Department from that of the Executive, by placing at its head a responsible party qualified for the duties of an Accountant.

The appointment of Mr. T. Graham relieved the Superintendent of the Road of all responsibility of details in accounts, and by doing so, afforded him increased opportunities of giving his time and attention to the constructive duties of his Office. I feel assured that the appointment of an efficient Accountant in Divisions of Public Works, where extensive operations are in progress, would, so far from increasing the cost of the works, effect a large reduction in expenditure, as it would render the principal Officer and his subordinates more efficient, inasmuch as their time and attention would be wholly devoted to the economical construction of the Public Works entrusted to their charge.

Requisition for advances for the payment of laborers are sent into the Office by Officers in charge of Divisions, and Overseers in independent charge of Sections. The Accountant examines their respective accounts, and if they exhibit close balances, he forwards their requisition to the Superintendent who affixes his signature and returns them to the Office, when the money is immediately despatched. In cases of emergency, the Accountant is authorized to comply with requisitions in anticipation of sanction.

The amounts of these advances are entered to the debit of the parties in a waste cash-book. Overseers, or others in charge of Sections, submit *daily* to the Superintendent lithographed Reports of the number of men and artificers on each description of work under their charge, and as the system of daily payments to laborers is enforced on this work, a certificate to the following effect is entered at foot of the "Daily Report."

"We do hereby certify that the numbers returned in this Report
"were present on this day, and employed solely on Government Works,
"and that the sums specified were paid to the laborers of each State
"by A. B. in the presence of C. D. and E. F.

"————, *Overseer,*
"*In charge of Section.*"

"*Officer in charge of Division.*"

These Reports are aggregated in eight-day reports, (or three reports per month,) which accompany an abstract exhibiting the amount of cash received in advance on requisition; the amount of pay accounts for labor, and bills for materials expended, and incidental charges, for all of which vouchers or receipts are requisite. These, after having been "passed" by the Superintendent, are closely examined as to their particular correctness by the Accountant. The debit side of these abstracts relieves the waste cash-book, and the credit side, (or items of expenditure), is transferred to the day-book, whence the items are posted to their respective Divisions.

At intervals of three months, or on completion of any particular work, a general inspection of the accounts is made by the Superintendent, who, after careful audit, attaches his signature to the totals of each book, and furnishes a certificate of such audit, which, with the vouchers, are deposited with the office records. An audit of this kind precedes the preparation of the Half-yearly Accounts Current submitted to the Accountant, North-Western Provinces.

Bills for the expenditure upon sanctioned works are upon their completion submitted to the Auditor General,* and from him are sent to the Accountant General, who speedily relieves the Superintendent of the Road from his responsibility for their amount. Independent of tools and material which are supplied on Indent by the various Ordnance Magazines, many articles of a local character are required for the works. These are either manufactured on the works, or obtained from contractors and tradesmen. They are entered to the debit of the General Stock Account, which obtains a corresponding credit by debit to the particular Division or work upon which they have been expended. Previous to any material being ordered, the signature of the Superintendent is affixed to the Indent, which has been previously signed by the Overseer and countersigned by his Officer, as absolutely necessary. At the beginning of each month, these Indents are forwarded to the Superintendent, in support of accompanying bills, for the cost of material, the items of which, with their prices, are tested by the Accountant. The bills, if satisfactory to the Superintendent, receive his sanction and form vouchers either for monthly contingent bill submitted to Government, or for the general bill for works.

The whole of the permanent establishment is paid as soon as possible after the first of each month, and a receipt taken from each individual. These are deposited in the Office as vouchers for the establishment abstract, the details of which are entered in the day-book, and each Division or work debited with its share. By these means the Road Officers and Overseers are reciprocally checks upon each other in the matter of disbursements, and the Superintendent and Accountant in the matter of accounts.

To the Secretary in this Department—*Ed.*

Every month a Progress Report is furnished to Government which exhibits the amount of work executed in each Division, the number of laborers employed, and the amount of cash expended.

The following books are kept in the Office :—

1*st.*—Divisional Ledger, in which are entered from the Day Book the various items of expenditure incurred in each Division.

2*nd.*—The Day Book, in which all items of expenditure are entered with numeral references to Ledger and Vouchers.

3*rd.*—Cash Book, in which assignments and valuation statements are debited, and all audited bills credited.

4*th.*—Waste Cash Book, in which are entered all advances on account of works.

5*th.*—Bill Book, in which all Bills are entered, and endorsed with copy of Civil Auditor's passing.

6*th.*—Indent Book, for tools, stores, and materials, obtained on indent.

7*th.*—Stock Book

8*th.*—Official Letter Book

9*th.*—Demi-official ditto and Circulars

29. Having stated the results of our operations during the past five years, I will now briefly [illegible] still to be done.

With reference to the road between Simlah and the plains, I have nothing further to propose. Within six months I fully anticipate its completion to a minimum width of 15 feet, which is sufficient for general [illegible] traffic. Much of the road will be above 20 feet in width, but 15 feet is the minimum within the parapet walls.

The extensive works connected with the Dugshai tunnel will not be completed within the [illegible] years, but as before stated, this will not affect the general readiness of the line.

With the exception of the tunnel, I already possess funds sufficient for the completion of this part of the road.

The military road from Kussowlee to Buddee, to open out a direct communication between the Punjab and the Military Sanataria, is under [illegible] completion.

With respect to the road from Simlah to the Chinese frontier, I must consider it to terminate in the neighbourhood of the first Chinese village or town, Shipké, as beyond that we cannot work without the sanction of the Chinese Government. Besides, as formerly stated, when once that point is reached, all obstacles to carriage by beasts of burthen cease.

Broad tracks formed from the most ancient times by the constant passage of horses and other baggage animals, communicate with the cities of Central Asia and Western China, and the only difficulties they exhibit are those incidental to a thinly populated country lying at a general elevation of 15,000 feet.

About 70 miles of very difficult road still remain unfinished, and to that which has been reported completed to 6 feet in width, several improvements are required.

The monthly grant for these works has hitherto been limited to 3,000 Rupees. I have already solicited its increase to 6,000 Rupees, in order to ensure the more speedy completion of the works.* With this grant for a period of three years, I feel confident of finishing the entire line from Simlah to the Chinese Territories, level almost throughout its whole extent, and broad enough for the transport of goods on mules and horses. I have further proposed the erection of Staging Bungalows at every 12 miles at a total cost of Rupees 16,000-0-0.

30. I cannot close this Report without bringing to the notice of the Governor General in Council, the zeal and intelligence displayed by the several Officers who have assisted in bringing these important works to their present forward condition. Lieutenant Dawson, (now Executive Officer in the Punjab,) and Major Cautley, (retired list,) each showed the most praiseworthy energy and perseverance in carrying out my orders, at times too when difficulties of no ordinary magnitude opposed, and when from the apathy and indolence of the hill-men, the greatest discouragements were placed in our way. Lieutenant Johnson, of the 33rd Native Infantry, (now Assistant Quarter-Master-General at Umballah,) and Lieutenant Montgomerie of the Engineers, each for some time in command of the 5th Company of Sappers and Miners, attached to the road, entered entirely into the spirit of the work, and gave me assistance as fully and cheerfully as if they had been Officers of the Road Department. Since their removal to higher employ, Mr. T. W. Knowles, Assistant Executive Officer, an intelligent and zealous young man, and Lieutenant Price, 31st N. I., have done what they could to further the work. The latter has lately been succeeded by Lieutenant Houchen, of the 55th N. I., who I have reason to believe will afford me every satisfaction in the discharge of his duties.

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* This has been granted.—*Ed.*

Of the Accountant's Department I have before spoken, and will, therefore merely state my entire satisfaction with the manner in which the head of it, Mr. Graham, has conducted his duties.

I will venture to say that no class of men in India have undergone greater privations with cheerfulness and unremitting attention to their duties than the Assistant Overseers of the Department of Public Works, and the Non-Commissioned Officers of the Sappers and Miners, attached to this road. They have been required to remain under canvas *in all seasons,* and these, within the Himalayas, embrace the extremes of temperature.

Some have been for years attached to distant Divisions in the far interior, shut out from intercourse with their comrades, and deprived of many of the comforts of life.

Of the usefulness and general good conduct of the small detachments from Her Majesty's 22nd, 32nd, 53rd, and 98th Regiments, which have been from time to time employed on this road, I cannot speak too highly. They are zealous, honest, and hard-working men; some of them have fitted themselves for independent charge of Sections; one of them who could neither read nor write when he joined the work, now conducts the duties of an Assistant Overseer to my perfect satisfaction. As the 20 Rupees per mensem they now receive as Staff Allowance is small in a country where provisions are dear, I have to solicit the sanction of Government to an increase of 10 Rupees per mensem to the allowances of those men whom I may find worthy of it.*

The value of such men, in operations such as this, cannot be overrated, and were their services more generally available, a great saving, both in *money* and *time,* would be manifest in the Public Works of India.

DAVID BRIGGS,

Superintendent, Hill Roads.

SIMLAH;
The 19th December 1855.

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* This has been sanctioned.—*Ed.*

APPENDIX.

APPENDIX A.

Being Major J. P. Kennedy's Paper on the principles of Hill Road-making, has already been printed in a separate form.

APPENDIX B.

Statement showing the Population of the Hill States, and the quotas of paid laborers demanded for the construction of the Hindostan and Thibet Road.

Names of States.	Population Census 1855.	Quotas demanded.	Remarks.
Bussahir,...	1,50,000	600	Never above 500 present.
Bhagul,...	24,600	100	
Bujjie, ...	9,000	50	
Bughat and Burrowlee, .	10,000	90	Never above 50 present.
Bulsun, ...	4,800	35	
Dhamee, ...	2,800	20	
Hindoor,...	50,600	160	
Joohul,...	17,200	115	
Kylure, ...	60,800	180	
Keunthul,......	25,700	115	With Thakooreeahs.
Komharsen, ...	7,800	60	
Koonyar,......	1,900	10	
Kotkhai,...	5,900	45	
Kotaha,...	3,900	30	
Kotgurh,...	2,700	20	
Mylog, ...	7,300	55	
Putteealah, ...	48,800	215	
Sirmoor, ...	75,500	200	
Turoche,...	3,000	20	
Total, ...	5,12,300	2,120	

DAVID BRIGGS,

Superintendent Hill Roads.

APPENDIX C.

Table showing the Results of Trials on pieces of Himalayan Timber, each piece an inch square, and sustained by supports 24 inches apart, the Weight being applied in the middle of the length. The pieces were imperfectly seasoned.

Description of Timber.	Weight of a Cubic Foot in pounds.	Comparative Stiffness or Weight that bent the Piece eleven-twentieths of an inch.	Comparative Strength or Weight that broke the Piece	Remarks.
		Pounds.	Pounds.	
Pinus Deodar, ...	41·5	190	228	Broke short without splitting
Pinus Longifolia,*......	50·5	171·5	304·5	Ditto ditto ditto ditto.
Quercus Incana, ...	73·75	230·	245·5	Split near centre.
Ditto Semicarpifolia, ...	73·	245·	335·	Ditto ditto one support.
Ditto Robur,†	50·47	Unknown.	322	Broke short without splitting.
Ditto Sessiflora,†	54·97		350	

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* This was less seasoned than the other pieces.

† These are taken from Tredgold's Experiments made in England, and placed here to assist comparison.

DAVID BRIGGS,

Superintendent Hill Roads.

APPENDIX D.

Experiments made at Simlah to test the efficacy of infusing into growing Timber Antiseptic Substances for the purpose of rendering it impregnable to the attack of Insects.

Description of Timber experimented on.	Distinguishing mark of Specimen.	Nature of Antiseptic Substances employed.	State of Timber after being buried at Umballah for four Months.
Pinus Longifolia or "Cheel"	A, ...	Sulph. of Copper and Salt, ...	Alburnum slightly destroyed.
	B, ...	Ditto ditto ditto, ..	Sound as when buried.
	C, ...	Unimpregnated, ...	Destroyed by white-ants.
	D, ...	Ditto, ...	Ditto ditto ditto.
Pinus Deodar or "Keloo"	E, ...	Sulph. of Copper and Salt, ...	Sound as when buried.
	F, ...	Ditto ditto ditto, ..	Ditto ditto ditto,
	G, ...	Unimpregnated, ...	Partially destroyed.
	H, ...	Ditto, ...	In good preservation.

Note.—B and C were buried together.
G and H ditto ditto.
A and B were pieces of one tree.
E and F ditto ditto ditto.

DAVID BRIGGS,
Superintendent, Hill Roads.

Letter from Captain H. Yule, Under-Secretary to the Government of India, to Captain D. Briggs, Superintendent of Hill Roads, Simlah,

Dated the 4th February 1856.

PUBLIC WORKS DEPARTMENT.

SIR,

I AM directed to acknowledge receipt of your letter forwarding your Report on the operations connected with the Hindustan Road, from 1850 to 1855.

2. This Report, I am desired to state, will be published as a No. of the Selections from the Records of the Government of India.

3. The Most Noble the Governor General remarks, that he can say nothing more laudatory, or more true of your exert[illegible] than that you have fully maintained since your return from furlough the [illegible]putation you had acquired before your departure. The Governor General, I am to add, will leave India with full confidence that the project of forming a road from the plains of India to Thibet, which His Lordship has regarded as of great importance in many ways, and in which he has taken a strong interest, will be completed in due time, and will be productive of all the benefits that have been anticipated from it.

4. To that end, the Government of India sanction the grant of Rupees 6,000 a month, which you have shown will be required to complete the road in three years to the Frontier.

5. I am instructed to offer to you, on the part of the Government, a renewal of the sentiments expressed to you in 1852,* together with the marked thanks of the Governor General in Council.

6. You are requested to convey to the Officers you have named, Lieutenant Dawson, Major Cautley, Lieutenant Johnson, and Lieutenant Montgomerie, Engineers, the thanks of the Government for their exertions in this work.

7. I am also to express the full approbation of the Government to Mr. Graham, and to the body of Overseers, who well deserve the increase of pay you recommend (*viz.* Rupees 10 per mensem each,) which you are accordingly authorized to disburse.

H. YULE, *Captain*,
Under Secy. to the Govt. of India.

FORT WILLIAM,
The 4th February 1856.

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* ***Extract from a Minute by the Most Noble the Governor General of India, dated the 6th July* 1852.**

"Lieutenant Briggs had great difficulties to contend with. He overcame them all, and I desire to place upon record my personal admiration of, and my gratitude to, that valued young Officer for the scientific ability, the indomitable energy and perseverance, the indefatigable personal exertion at all seasons and under all circumstances; and the still rarer tact and suavity of disposition by which he was able to unite the exertions of all for the accomplishment of a common object, and to complete, in its main features, within a very short time, a public work which, I take leave to say, will prove to be, though it is now little known and trumpeted, as creditable in its motives, its execution, and its results to the Government of India, as any work which has come under my notice since I have been here.

* * * * *

"It is with great regret I add, that the report to which I have alluded has not been furnished, and that the work itself may, perhaps, be delayed in consequence of the serious illness of Lieutenant Briggs. Incessant exposure to the sun has struck him down, and he has been peremptorily ordered to proceed for a time to England.

"I have felt it my grateful duty to speak of the merits of this Officer as they deserve, before his departure, and to express my hope, that whoever may administer the Government of India on Lieutenant Briggs' return, may have his attention drawn to talents and qualities which render that Officer peculiarly fitted to render most effective and valuable service to the Government of the country.

"I would propose that, with the concurrence of my colleagues, a copy of this record may be communicated to Lieutenant Briggs.

'DALHOUSIE."

Such an arrangement will of course increase the amount of the first outlay; and also augment, though in a much smaller proportion, the annual expence of maintaining the proposed line of communication; but, on the other hand, certainty—regularity—security—and despatch will be absolutely ensured. To spare a few thousand pounds in the first outlay for such a project would be the less excusable, because the objects, in which chiefly fixed capital would be invested, are of a nature which would be sure to reproduce the capital sunk in them. Efficient steam-ships will, for a long period of time, find a market, even if it be necessary or advisable that the government should dispose of them; but, independently of this, the exigencies of the state will, from year to year, require such a supply of these vessels, that there can be no reasonable apprehension of being overstocked by a few powerful steam-ships in the event of the abandonment of this project.

A mistaken desire to cut down the probable expence of the project to the lowest practicable limit, has induced the parties interested in this measure, to recommend a class of vessels for it of a power and tonnage decidedly inferior to that which such voyages would render most advisable.

Not affected, therefore, by the apprehension that I shall scare your Lordship's administration and the Honourable Company by the scale of expence of the establishment which I shall recommend, I shall advise at once the adoption of steam-ships of a thousand tons burthen, and two hundred and fifty horse power. One of these should be appropriated to the passage between Calcutta and Point de Galle, touching at Madras; a second should perform the stage between Point de Galle and Socotra; a third between Bombay and Socotra; a fourth between Socotra and Camaran; and a fifth between Camaran and Suez, touching at Kosseir. These vessels should be built of the same magnitude—upon the same model,—and should correspond to each other, with the last degree of precision, in every particular, nautical and mechanical; so that any part of one would admit of being interchanged for a similar part of another. Thus, any part of the machinery or stores, for any one of these vessels, would be fitted for any other. The berths and other conveniences provided for passengers would precisely correspond. The first steamer would convey its freight from Calcutta to Madras: it would there take in the Madras passengers and despatches, and convey the whole to Point de Galle. In average weather, the time from Calcutta to Madras (765 miles) would be four days; and the time from Madras to Point de Galle (530 miles) would be three days; and allowing a day at Madras, the time of the passage from Calcutta to Point de Galle would be eight days. The first steamer would there transfer its contents to the second, and would rest for the purpose of cleaning the boilers, machinery, &c. The second steamer, receiving in addition to the passengers and despatches from Calcutta and Madras those of Ceylon, would proceed to Socotra; and, except in the south-west monsoon, would make the passage in eight and a half days. At Socotra she would meet the steamer plying between Bombay and that place. This latter voyage (1,210 miles) would, except in the monsoon, be performed in six days. For this stage a steamer of less power and tonnage, than that which we have mentioned, would perhaps be sufficient, the number of passengers and despatches to and from Bombay being less in a considerable proportion than the other ports of India. But a convenience would be obtained from uniformity in all the steam-ships which would more than counterbalance any increased expence which would arise from the greater size and power of the Bombay steamer. Independently of this, another material advantage would result from the greater power of the vessel of larger tonnage to encounter the monsoon: small vessels with the same or a greater proportion of power cannot resist adverse weather as effectually as larger ones; a vessel, for example, of 600 tons and 150 horse power would not be as efficient against the monsoon as one of 1,000 tons and 250 horse power,—although the proportion of power to tonnage would be in both cases the same.

The steamers coming from Point de Galle and Bombay would deliver to the fourth steamer at Socotra their passengers and despatches; and the latter would convey them from Socotra to Camaran (790 miles) in four days. At Camaran the passengers, &c., would be transferred to the fifth and last steam-ship, by which they would be brought to Suez (1,065 miles), touching at Kosseir (815 miles), to land such passengers as might prefer the route through Egypt by Luxor, or Kennah and the Nile. The time from Camaran to Kosseir would be 4 days, and from Kosseir to Suez 2 days.

Thus the time of the passages from Calcutta, Bombay, Madras, and Ceylon to Suez, respectively, allowing for the necessary delay, would be as follows:—

Time from Calcutta to Suez.

	Days.
Calcutta to Madras,	4
Delay at Madras,	1
Madras to Ceylon,	3
Delay at Ceylon,	1
Ceylon to Socotra,	8½
Delay at Socotra,	2
Socotra to Camaran,	4
Delay at Camaran,	0½
Camaran to Kosseir,	4
Delay at Kosseir,	0½
Kosseir to Suez,	2

Time from Calcutta to Suez, 30½ Days.

Time from Madras to Suez.

	Days.
Madras to Ceylon,	3
Delay at Ceylon,	1
Ceylon to Socotra,	8½
Delay at Socotra,	2
Socotra to Camaran,	4
Delay at Camaran,	0½
Camaran to Kosseir,	4
Delay at Kosseir,	0½
Kosseir to Suez,	2

Time from Madras to Suez, 25½ Days.

Time from Ceylon to Suez.

	Days.
Ceylon to Socotra,	8½
Delay at Socotra,	2
Socotra to Camaran,	4
Delay at Camaran,	0½
Camaran to Kosseir,	4
Delay at Kosseir,	0½
Kosseir to Suez,	2

Time from Ceylon to Suez, 21½ Days.

Time from Bombay to Suez.

	Days.
Bombay to Socotra,	6
Delay at Socotra,	2
Socotra to Camaran,	4
Delay at Camaran,	0½
Camaran to Kosseir,	4
Delay at Kosseir,	0½
Kosseir to Suez,	2

Time from Bombay to Suez, 19 Days.

Steam-ships, of the power and tonnage already described, and constructed in all respects in the best manner, would continue throughout the year to accomplish their passages in the average time I have here computed, with the exception of the season during which the south-west monsoon prevails, that is from June to September. During this season the passages to India would be shorter than those above stated; but the passages in the contrary direction would be longer.

Indeed, some doubt appears to rest upon the practicability of the passage from Bombay to Socotra in certain states of the weather during that season. It is contended that, when the monsoon is very violent, a steam-ship could not effect that passage. It might therefore be found expedient, in the arrangements for the establishment of this great line of communication, to place a depôt at the head of the Maldives, where, at seasons when the monsoon is most violent, the Bombay steamer might meet the steamer from Calcutta.

The course from Bombay to the Maldives, during the monsoon, would be quite practicable, as well as the course from the Maldives to Socotra.

Indeed, it might be advisable at all events to provide a station of refuge at the Maldives, where, in stress of weather, or in any accidental derangement of the machinery, the steamer between Ceylon and Socotra might put in.

I have before me a chart accompanied by an account of the Head of the Maldives, by Lieutenant Powell, R. N., from which it appears that a safe and practicable harbour may be obtained there for this purpose*.

It may perhaps be contended that in certain states of the weather, which occur occasionally during the season of the monsoon, the steamer could not without difficulty make the Maldives from Ceylon. I do not think such cases would practically occur if steam-ships of the power and tonnage which I have proposed be adopted. But even if it should on extraordinary occasions happen, still the passage may be made by going from Ceylon south to the north-east trade, and running west with that wind until the monsoon is converted into a favourable wind for making Socotra.

The chief stations for fuel, exclusive of those at the presidencies, would be the islands of Socotra and Camaran, and it would be advisable to place in their respective harbours large hulks of old vessels, as depôts for coals, so that the steamers lying beside them might receive their complements of fuel. Besides these, however, depôts for occasional supply should be established at Suez and Kosseir. The upper decks of these hulks should be fitted up with a smith's forge, together with the tools and other implements necessary for the repair of those parts of the machinery which are most liable to derangement.

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* See an account of these islands, Appendix (E.).

There might also with advantage be deposited at the several stations duplicates of the various smaller parts of the mechanism; and as I have recommended that all the vessels, including their machinery, should be precise counterparts of each other, these duplicates would be fitted for any of them.

The five steamers which I have recommended would probably be sufficient to work the whole line of communication between India and Suez, because on occasions when any one of them would require to be refitted, the line might be worked by the remaining four: thus the distance between Socotra and Suez could be worked for a short time by a single steamer, although it would be too much for a continuance. It would, nevertheless, be expedient to provide a sixth steamer, to be either laid up at Galle, or used for the purposes of the company or government in India, which might occasionally take the place of any vessel on the line requiring to be refitted.

From a careful examination of the performances of the Admiralty steamers, I find that a well-constructed vessel, supplied with the most efficient machinery (such, for example, as the frigate Medea), will be propelled in average weather a distance of 2,150 geographical miles by a ton of coals for each horse power in her machinery. The Medea is a vessel of 800 tons burthen, with 220 horse power, and bears a close analogy to the steam-ships of 1,040 tons burthen and 250 horse power, which I have recommended*.

I shall be therefore justified in assuming that on an average 250 tons of coals will transport such vessels 2,150 miles. The fuel which will be consumed on the several stages is therefore a matter of easy arithmetical calculation.

Estimate of coal to be consumed per passage between India and Suez:—

	Distance in Miles.	Fuel in Tons.
Calcutta and Madras, ..	765	88
Madras and Ceylon, ..	530	62
Ceylon and Socotra, ..	1,660	192
Bombay and Socotra, ..	1,210	140
Socotra and Camaran, ..	790	92
Camaran and Suez, ..	1,065	124
	6,020	698

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* See Edinburgh Review, No. 171.

It appears, therefore, that each complete passage between Suez and the several ports of India, will consume 698 tons of coals; now if we contemplate a monthly communication, there will be 24 such passages per annum; and consequently the annual consumption of coals on the eastern side of Egypt will be about 17,000 tons; but to allow for contingencies let it be taken at 18,000 tons.

I have stated that the cost of fuel in India, at the places where vessels would take it in ballast, or otherwise, would be about 25*s.* per ton: at Socotra, Camaran, and Suez, it could not on the average exceed double that price.

It may be assumed, that of the whole amount of fuel necessary to work the line between Suez and India, one half will be supplied in India, and the other in Socotra and the Red Sea; the average price, therefore, would be 37*s.* 6*d.* per ton, which, for 18,000 tons, would give, for the total annual expence of fuel on the eastern side of Egypt, 33,750*l.*

The first cost of a steam-ship of 1,000 tons, with machinery of 250 horse power, well appointed in every respect, and supplied with the very best machinery complete for sea, would be 30,000*l.**. Taking the duration of the vessel at fifteen years, the following statement will show the annual charge of maintaining such a vessel, exclusive of the fuel, the officers, and crew:—

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* Steam-ships built in the Thames would exceed this estimate; but equally efficient vessels can be built in the outports for the sum I have stated.

Capital sunk annually, on vessel and machinery, the vessel to last for 15 years,	£2,000
Interest on capital at 4 per cent.	1,200
Insurance at 7½ per cent. on half the capital,	1,125
	£4,325

The annual expence for maintaining six vessels would therefore be 25,950*l.*

To this must be added the salaries and wages of the officers and crew, the engineers, stokers, &c. together with the repair of machinery, &c. as follows:—

Commander,	£400
First mate,	200
Second mate,	130
Third mate,	66
First engineer,	300
Second engineer,	200
Third engineer,	150
Eight stokers,	400
Ten seamen and twenty Lascars,	720
Maintenance of officers and crew,	1,380
Engine room stores,	400
Ship stores,	300
Repairs of vessels and machinery and contingencies,	1,864
	£6,500

The whole annual cost of the establishment between India and Suez (exclusive of stations), would therefore be as follows :—

Maintenance, &c., of five working vessels and one spare vessel,	£25,950
Fuel,	33,750
Salaries and maintenance of officers, crew, &c., and repairs of vessel, machinery, and contingencies for five working vessels,	32,500
	£92,200

Assuming that suitable wheel carriages are provided for the transport of passengers between Suez and Cairo, (to which, as I have stated, there is at present no physical obstacle, and to which the ruler of Egypt is understood to be favourably disposed), the journey between these places may be performed with ease and certainty in five or six days, and with despatches alone would be effected by a courier in much less time. But by whatever means this part of the communication may be made, it is absolutely essential that it should be conducted under the same management and the same responsibility as the remainder of the route for the reasons already stated.

The distance between Alexandria and Falmouth is 2,800 miles, which might be performed by a steam ship of the same tonnage and power as those which I have recommended for the eastern side of the isthmus. It would be necessary (if the same vessel be continued through the whole passage from Alexandria to Falmouth) that she should take in coals at Gibraltar. This vessel would effect the passage between Alexandria and Falmouth in about fifteen days in average weather; and if one day be allowed either to take in coals at Gibraltar, or if it were thought more advisable to transfer the passengers, &c. to another vessel, the total time between Alexandria and Falmouth would be sixteen days.

Thus the whole time, allowing for the necessary stoppages between the several ports of India and London, would be as follows;—

Time between Calcutta and London.

		Days.
Calcutta to Suez (see p. 45),	..	30½
Suez to Alexandria,	..	6
Alexandria to Falmouth,	..	16
Falmouth and London,	..	1½

Time between Calcutta and London, 54 Days.

Time between Madras and London.

		Days.
Madras to Suez (see p. 45),	..	25½
Suez to London,	..	23½

Time between Madras and London, 49 Days.

Time between Ceylon and London.

		Days.
Ceylon to Suez (see p. 46),	..	21½
Suez to London,	..	23½

Time between Ceylon and London, 45 Days.

Time between Bombay and London.

	Days.
Bombay to Suez (see p. 46), ...	19
Suez to London, ...	23½
Time between Bombay and London,	42½ Days.

These estimates of the time of the passage are of course to be taken as average calculations. In the height of the south-west monsoon, the outward passage would probably be shorter by several days than the times given above, while the homeward passages would be proportionally longer. During the north-east monsoon the homeward passages on the other hand would be occasionally several days shorter than the time computed, while the outward passages would be on the contrary longer.

The maintenance of the communication between Alexandria and Falmouth, with the necessary regularity and certainty, would require three steam-ships. As, however, it may be presumed, that a portion of the passengers arriving from India at Alexandria would adopt other routes, vessels might be adapted for this passage of less capacity and power than those proposed on the Asiatic side of Egypt. I would propose, therefore, to establish between Alexandria and Falmouth three vessels of 800 tons burthen and

APPENDIX.

APPENDIX (A.).

ON THE ROUTE TO INDIA BY THE EUPHRATES.

Whatever may be the ultimate result of the experiment conducted by Colonel Chesney with a view to establish a line of communication with India by the Euphrates, it is impossible not to admire the skill, enterprize, zeal, and perseverance of that distinguished officer; and if the expense of the experiment produce no other return than the increased precision which it will give to geographical, statistical, and scientific knowledge respecting that great river, the money will be well bestowed. Considering, however, that the main object of a great oriental line of steam navigation, would be to establish the shortest and most direct route, to the centre of Indian commerce, Calcutta, and that that route should not be one merely for correspondence but for passengers also, and for such light objects of transport as would render transhipment easy and unobjectionable, the slightest consideration of the circumstances of the land route through Syria, the geographical position of the Euphrates, the nature of its navigation, and the position of the Persian gulf cannot fail to render manifest the unfitness of this route compared with that proposed by the Red Sea, even supposing the question of the navigation of the Euphrates and the practicability of crossing Syria by land to be established in the most favourable sense. But it cannot be pretended that this has been decided. The transit from Beyroot or Scandaroon to Bir is assuredly at present not what Colonel Chesney himself would advise to be encountered by Families. Whether the river Euphrates below Bir can be rendered safely and conveniently navigable for such a purpose remains to be decided.

These and many other reasons lead to the conclusion that the route by Egypt and the Red Sea should be that which ought to be, and which can be, immediately and permanently established.

This, however, is no reason why the project of opening the Euphrates should be abandoned. Many advantages would attend such a measure, independently of those which would attach to it merely as a route between this country and the east.

It would materially benefit and extend the commerce, already considerable, between India, Persia, and Turkey. It would divest the navigation of the Persian gulph of the nuisance of piracy, and in cases of emergency when the south-west monsoon might by possibility render a communication with Bombay by the Red Sea difficult, the Euphrates might at least furnish the means of forwarding despatches to Europe from that Presidency.

APPENDIX (B.).

The following documents will in some degree illustrate the intense interest felt in India concerning this question.

No. I.

CIRCULAR PUBLISHED IN CALCUTTA,

April, 1836.

The accompanying copies of a petition to the House of Commons, and of memorials to the Board of Control and the Court of Directors of the East India Company, praying for the immediate establishment of a steam communication by way of the Red Sea, between the four principal ports of India, namely, Bombay, Galle, Madras, and Calcutta, and England, are circulated in full confidence that an appeal from several thousands of their fellow-subjects in this distant country, a great portion of whom are cut off from the land of their birth and their affections, by an interval between their correspondence with their friends and connexions, of ten to twelve months, will meet with sympathy and support from all classes at home.

To those who have spent any portion of their lives in this country, and have returned to their native home, nothing need be said touching the value and importance, in every point of view, of shortening that interval one half.

To those who have never experienced the anxiety arising from such a separation from their dearest connexions, and to those who may hitherto never have had occasion to give the subject any consideration at all, it may be necessary briefly to notice the vast importance of the establishment of a thorough and complete steam communication between England and all parts of India.

The value of such a communication to natives of the British Isles, whose lot is cast in India. from the Governor General himself to the humblest individual, has been referred to, and there are many in England who will, from the experience of their own anxiety, readily concur in feeling the value of such early information.

But great and important as may be the advantages of such a communication to such persons, including every single individual, male and female, of British birth, they are in reality nothing in the scale of advantages which must necessarily result to both countries, from steam communication between England and ALL PARTS OF INDIA, if established on those principles alone, which have in like cases been found to answer, namely, speed, regularity, security, and the junction of all places of importance interested in the mutual intercourse.

A reference to the incalculable benefits which have arisen in England during the last seventy years, from the increased facilities of intercourse, derived from—first, the establishment of mail coaches, and their extension to all the most distant parts of the country, with the consequent improvement of the roads—then the canals—and finally the establishment of steam vessels, as well for coast as inland navigation—and, above all, that of railroads is sufficient to show the truth of Lord William Bentinck's opinion, that the advantages *direct* and indirect, of steam communication between England and India are so great, that they "would be cheaply bought at any price."

If the general shortening of the time required for intercourse, personal and written, between the several places in England, having mutual relations, has been productive of such great advantages, it is easy to see that a similar reduction in the periods of intercourse, between two such countries as England and British India, cannot fail to induce like advantages in the ratio of their far more extended, and far more important mutual interests and duties.

To India, England is indebted for wealth, for fame, and, in some degree, for the prominent station she holds among the nations of the world. In return, she has a duty to perform to the countless millions subject to her sway—a duty which can never be performed as it ought to be until the barrier which upholds their mutual ignorance, and thence fosters their mutual prejudices, is broken down.

That barrier once removed, can it be for one moment doubted that the arts, the sciences, the civilisation, the capital of England would rapidly find their way to India? Their very nature is to extend—they only require a road, and when that is made easy to any place needing their presence they cannot but go. India does need, and England can furnish them—and it is her duty to do so.

It is her bounden duty to open wide the doors of India, for the entry and spread, EMPHATICALLY, of the knowledge of Europe. It is the one thing needed in India to enable her to advance, as, *under the dominion of England*, she ought to do, in the scale of nations; and this can only be done effectually, by approximating the two countries in the manner proposed.

Among the advantages to England, would be the more ready employment of capital, with consequent extension of commerce, and the greater security of the Indian empire; but it is of course impossible in an address of this nature to point out minutely the advantages of such a communication: to those who give attention to it these advantages become more and more apparent; and nothing would appear to be wanting to ensure that communication being established, as it ought to be, on the most enlarged and perfect scale, but a similar general expression of the public desire of the British islands, as has now been long declared through all parts of India, and, in the hope of inducing that expression, this appeal is made.

No. II.

CALCUTTA PETITION,

To be presented at the Meeting of Parliament by the Right Hon. Lord Wm. C. Bentinck, M. P.

To the Honourable the Commons of the United Kingdom of Great Britain and Ireland in Parliament assembled:

The humble Petition of the Inhabitants of Calcutta and its neighbourhood

SHEWETH,

That the establishment of a steam communication between India and England has been for several years past the ardent desire of the whole of the British inhabitants of this country, and that this desire has of late years extended to the natives; and that the public wish of all India has been lately expressed in the strongest manner by the voluntary subscription of a sum exceeding three lacs of rupees, of which above one lac and a half were subscribed in Bengal alone, a great part thereof by natives, for the furtherance of this eagerly sought measure.

That, however the subscription of such a sum, without any view to pecuniary return, may evince the anxiety of all India for the establishment of such a communication, yet your petitioners feel that it is impossible to establish it, much less to carry it on, except by means of the united powers of his Majesty's Government and the East India Company; and your petitioners learned, therefore, with the utmost satisfaction that a Select Committee of your Honourable House had resolved under date 14th July, 1834,—

> "That a regular and expeditious communication with India by means of steam-vessels is an object of great importance both to Great Britain and to India. That it is expedient that measures should be immediately taken for the regular establishment of steam communication from India by the Red Sea. That it be left to his Majesty's Government in conjunction with the East India Company to consider whether the communication should be in the first instance from Bombay, or from Calcutta, or according to the combined plan suggested by the Bengal Steam Committee; and that by whatever line the communication be established the net charge should be divided equally between his Majesty's Government and the East India Company."

That your Petitioners considered these resolutions as a pledge that immediate measures would be taken for establishing such communication in the manner best adapted for meeting the wants and wishes of all the principal ports of India.

That it is therefore with pain proportionate to the satisfaction which they felt in hearing of the pledge of your Honourable House to perfect this their anxious desire, that your Petitioners find that up to the date of last advices from England nothing had been done in redemption of that pledge; that no steps appeared to have been taken for the regular establishment of steam communication from India by the Red Sea; and that no effectual consideration had been given, by his Majesty's Government in conjunction with the East India Company, to the only question which your Petitioners understand to have been left to their decision before giving effect to the resolutions of your Honourable House—namely, whether the communication should be in the first instance from Bombay, or from Calcutta, or according to the combined plan suggested by the Bengal Steam Committee.

That your Petitioners beg leave to submit to the consideration of your Honourable House the following opinion lately expressed by a Right Hon. Ruler of this country, regarding the importance of steam communication between this country and Europe, viz.—

> "I have been a zealous supporter of the cause of steam communication, from the strongest conviction, confirmed by every day's further reflection, of its vast importance to innumerable interests, both national and commercial. I cannot command the opportunity of forwarding its future success, but if within my reach you may depend upon my most earnest efforts to promote its progress, and to obtain for India an advantage so great in all its *direct* and indirect consequences, that, in my opinion, it would be cheaply bought at any price."

Your Petitioners, fully concurring in the sentiments above expressed, humbly but earnestly pray that your Honourable House will graciously adopt such measures as to your wisdom may seem requisite for the immediate carrying into effect the resolutions of the Committee of your Honourable House for establishing a regular, expeditious, and frequent communication between the principal Indian ports and Great Britain by means of steam-vessels by way of the Red Sea.

And your Petitioners will ever pray.

Calcutta, 5th March, 1836.

[This petition was signed by three thousand five hundred and forty-two British and native inhabitants of Calcutta and its neighbourhood, including the three Judges of the Supreme Court of Judicature,—the Commander-in-chief, and three other Members of Council,—Judges of the Sudder Dewanny, and Nizamut Adawlut,—Members of all the Public Boards, and generally the heads of every Public Department,—the British merchants of Calcutta,—the highest classes of native subjects,—the native merchants, especially those connected with the silk trade, and that carried on between Calcutta and the Red Sea. Since which, signatures from the interior make the total 7,632.]

No. III.

CALCUTTA MEMORIAL TO THE INDIA BOARD.

To the Right Honourable the Board of Commissioners, &c.

The respectful Memorial of the Inhabitants of Calcutta and its Neighbourhood, duly convened in the Town Hall, on Saturday, March 5th, 1836:

Sheweth,—That your Memorialists having the greater part of them for many years, and all latterly, felt the vast importance, as well to Great Britain as to India, of establishing a regular and expeditious communication with England by way of the Red Sea, by means of steam vessels, received with the utmost satisfaction the announcement of the following resolutions of the Select Committee of the House of Commons, dated the 14th July, 1834, and afterwards adopted by the Honourable House, viz.,—

"That it is the opinion of this Committee that a regular and expeditious communication with India, by means of steam-vessels, is an object of great importance both to Great Britain and to India. That it is the opinion of this Committee, that the experiments which have been made have been attended with very great expense: but that, from the evidence before the Committee, it appears that by proper arrangements the expense may be materially reduced; and, under that impression, it is expedient that measures should be immediately taken for the regular establishment of steam communication from India by the Red Sea. That it is the opinion of this committee, that it be left to his Majesty's Government, in conjunction with the East India Company, to consider whether the communication should be in the first instance from *Bombay*, or from Calcutta, or according to the combined plan suggested by the Bengal Steam Committee. That it is the opinion of this Committee, that, by whatever line the communication be established, the net charge of the establishment should be divided equally between his Majesty's Government, and the East India Company, including in that charge the expense of the land conveyance from the Euphrates on the one hand, and the Red Sea on the other, to the Mediterranean."

That your Memorialists have anxiously looked for the result of the consideration thus pressed upon the notice of his Majesty's Government in conjunction with the East India Company, which they confidently expected would lead to the immediate establishment of steam communication with England by way of the Red Sea in the manner best adapted to meet the wants and wishes of all the principal ports in India: and that your Memorialists were the more confirmed in their hope and expectation that no delay would be allowed to take place in giving the subject that consideration which its importance demands by the publication in the papers of this presidency of a letter addressed to the Secretary to the Committee of the New Bengal Steam Fund by the Secretary of your Right Honourable Board under date 8th November, 1834, wherein they were informed that the subject was then under the consideration of his Majesty's Government and the East India Company, and that the result would be communicated to the Government of India.

That your Memorialists regret to find that no effectual consideration appears to have been yet given by his Majesty's Government and the East India Company to the matters pressed upon their considerate attention by the above resolutions of the House of Commons; and that the president of your Right Honourable Board is reported to have expressed himself in somewhat doubtful terms as to the certainty of that communication being established, which he admitted it was the duty of the East India Company with the aid of his Majesty's Government to take steps for effecting.

That your Memorialists have received this intimation with a degree of pain proportionate to the pleasure with which they received what they looked on as an assurance of the House of Commons that their ardent and long entertained wish would be immediately realised.

That your Memorialists beg respectfully to press upon the consideration of his Majesty's Government, through your Right Honourable Board, the vast importance of speedily following up the recommendation of the House of Commons by establishing a regular and expeditious communication between this country and Great Britain, by means of steam vessels, by way of the Red Sea; and on this point your Memorialists beg to be permitted to lay before your Right Hon'ble Board the following expression of the testimony of the Right Hon'ble Lord William Cavendish Bentinck, the late Governor General of India, made on the eve of his departure for England.

> "I have been a zealous supporter of the cause of steam communication with Europe from the strongest conviction, confirmed by every day's further reflection, of its vast importance to innumerable interests, both national and commercial. I cannot command the opportunity of forwarding its future success, but if within my reach, you may depend upon my most earnest efforts to promote its progress, and to obtain for India an advantage so great in all its *direct* and indirect consequences, that, in my opinion, it would be cheaply bought at any price."

That your Memorialists deem it proper to bring to the notice of your Right Honourable Board that the average number of letters received from England and despatched thither in India through the post-offices annually may be taken as follows :—

	Received.	Despatched.
Calcutta (*on an average of 5 years*),	98,189	72,397
Madras (*on an average of years*),	31,306	40,614
Bombay (*from a note of the Post Master General*),	30,000	24,000
Galle,—*the number received is not known, but say*,	6,000	
The number despatched is from official reports,		6,505
	165,495	143,516
Together,		309,011

That the average annual amounts of mercantile transactions with Europe at the above places were on an average of three years, viz. 1829-30 to 1831-2 as follows:—

Calcutta,	Rs.	3,79,49,681
Madras,	—	59,10,042
Bombay,	—	1,63,89,629
Ceylon,	—	18,88,007
Together,	Rs.	6,21,37,359

That the valuable commerce just noticed was the average of the private transactions of the above places prior to the abolition of the right to trade on the part of the East India Company; and that the annual average amount of the trade of the Company during the same period from Calcutta and Madras was, Rupees, 1,91,77,493, exclusive of that from Bombay, (which is unknown to your Memorialists), which amount must eventually be involved in the private transactions of the commercial community of the two places, making altogether a trade amounting annually to the sum of Rs. 8,15,14,852, exclusive of the late trade of the Hon'ble Company at Bombay, the amount of which is not known, connected with the commercial correspondence of the above places with Europe*; and, in addition thereto,

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* Bengal,	Sa. Rs.	1,56,35,517
	Rs.	1,68,38,861
Madras,		2,03,38,632
The late trade of the Honourable Company at Bengal and Madras,		1,91,77,493
Private commerce of Calcutta, Madras, Ceylon, and Bombay,		6,23,37,359
	Rupees,	8,15,14,852

your Memorialists beg to draw to the attention of his Majesty's Government that the trade of China with England, which amounts to the value of from 5,000,000*l.* to 6,000,000*l.* by the year, is dependent on India during six months out of the twelve for yearly communication with Great Britain.

That the average number of passengers annually arriving at, and departing from, the undermentioned places may be taken as follows :—

	Arrivals.	Departures.
Calcutta,	... 767	... 665
Madras,	... 573	... 459
Bombay,	... 287	... 316
Ceylon,	... 85	... 17
	1,712	1,457

And your Memorialists respectfully draw the particular attention of your Right Honourable Board to the above statement regarding passengers ; because the Committee of Merchants of Calcutta, who made a tender to the Government here to establish, on certain terms, a regular communication, by way of the Red Sea, with Great Britain, by means of steam-vessels, gave it as their opinion, after very full and minute investigation, that the communication must depend, in a material degree, upon the support of passengers for paying its expenses.

That your Right Honourable Board may in some measure judge of the probability of the steamers being constantly filled with passengers, when regularly despatched, from the fact, that the *Hugh Lindsay's* accommodations were taken up months before the time at which she was advertised to sail, and that several parties travelled overland, a distance of 1,000 or 1,200 miles, only to be disappointed, though arriving two months prior to the time fixed for her departure.

That in regard to the expense which the establishment of a sufficient number of steam-vessels would occasion to the East India Company, your Memorialists respectfully submit that the resolutions of the House of Commons, proposing that the net charge of the establishment should be divided equally between his Majesty's Government and the East India Company, appears to have very greatly reduced the force of the only objection raised against immediately putting these resolutions into execution, namely, the state of the finances of the Honourable Company, and upon this head of expense, your Memorialists beg leave to observe, that prior to the departure of the late Governor General of India, the Merchants of Calcutta, after the most ample inquiry, offered to his Lordship to establish and maintain, by means of vessels of the largest size and power, independent of the existing communication between Malta and Falmouth, a regular quarterly communication between England and the four ports, Bombay, Point de Galle, Madras, and Calcutta, including the passage across the isthmus of Suez, provided they got three lacs of rupees by way of bonus, and five lacs of rupees annually, for five years, from the Government, the Government retaining the postage; a calculation, which, if at all correct, your Memorialists venture to affirm, would make the annual charge to be equally borne by his Majesty's Government and the East India Company, a sum so small, as neither your Right Honourable Board, nor the East India Company would allow to outweigh the advantages, direct and indirect, which the establishment of such a communication on an extended and liberal scale is calculated to induce.

Upon these advantages your Memorialists abstain from enlarging, satisfied that the value of such a communication must be duly appreciated by your Right Honourable Board.

That, in conclusion, your Memorialists respectfully, and most earnestly, pray that the resolutions of the House of Commons may be forthwith fully acted upon, and that steps may be immediately taken by your Right Honourable Board, in conjunction with the East India Company, to establish a regular steam communication between the prin'ciple Indian ports and Great Britain, by way of the Red Sea.

No. IV.

LETTER TO LORD WILLIAM CAVENDISH BENTINCK.

My Lord,

Having been entrusted by the inhabitants of Calcutta and its neighbourhood with a petition to the House of Commons, praying for the immediate establishment of a steam communication by way of the Red Sea, between the principal ports of India and England, and directed to transmit it to an influential member of the House of Commons, conversant with the affairs of India, with a request that he will present the same to the House of Commons, and support the prayer thereof, we could not for a second hesitate in our choice, if aware that your Lordship had resumed your seat in the Commons House of Parliament. Sure are we that the whole of India would have alone looked to your lordship as the single individual, to whom, before all others, should be entrusted the advocacy of a measure which owes to your Lordship its present advanced position.

To whom could we so consistently or so aptly apply, as to him, who, placed at the head of this empire, and qualified alike from station and talents to judge of the importance of the establishment of an efficient and comprehensive communication, has pronounced it to be fraught with advantages, direct and indirect, so great, as to render its purchase cheap at any price.

To you then, my Lord, we consign the petition of the inhabitants of Calcutta and its neighbourhood to the House of Commons, praying for the immediate establishment of a steam communication by way of the Red Sea, between the principal ports of India and England, with the most perfect assurance, that should your Lordship have resumed your seat in the House, it will receive at your hands all that the most ardent friends of the measure can desire.

On the other hand, should your Lordship not be a Member of the House of Commons, we respectfully request the favour of your selecting such an individual Member as in your Lordship's judgment may be most fitly entrusted with the duty of advocating a cause of such universal importance, as that of bringing into closer contact two parts of the world so widely separated by distance, yet so intimately connected by mutual interests. It may not be inexpedient here to state that the petition has above 3,500 signatures, including those of the Judges of the Supreme Court, the Commander-in-chief and three other Members of Council, four of the Judges of the Sudder Dewanny and Nizamut Awdalut, the members of all the Public Boards, and generally the heads of all the Public Departments of every branch of the merchants and traders, British and native; of the highest classes of native subjects, who, as known to your Lordship, have of late years advanced considerably in a just appreciation of the value of extensive general information, and are convinced that such information can be best, if not alone, obtained by shortening the distance between this country and the seats of European science.

The petition has also the signatures of the great body of native merchants connected with the silk trade, and of those who conduct the extensive commerce of this place with the Red Sea. In a word, we are satisfied that no petition ever forwarded to the House of Commons more fairly or more fully represented the wants and desires of the petitioners than does that now committed to your Lordship's care, those of this vast empire.

We have caused the petition and this letter to be forwarded to Captain Grindlay, with a request that he will present them to your Lordship, and afford all the personal aid in his power towards the attainment of the object in question, and for that purpose that he will attend to any suggestions which your Lordship may condescend to offer.

For ourselves, my Lord, we gladly seize the opportunity of repeating the grateful sense we entertain of the uniform support which we have ever received at your Lordship's hands in furtherance of the great object entrusted to us, and renew our continued sincere wishes for your Lordship's health and happiness, and we are,

My Lord, yours, &c.
(Signed) W. H. MACNAGHTEN,
DWARKANAUTH TAGORE,
J. PRINSEP,
W. N. FORBES,
B. HARDING,
R. H. COCKERELL,
D. M'FARLAN,
J. KYD,
THOMAS E. M. TURTON,
JOSEPH WILLIS,
JAMES H. JOHNSTON,
MOTHOORNAUTH MULLICK.
CHARLES B. GREENLAW.
(True Copy) C. B. GREENLAW,
Secretary.

Calcutta Town Hall,
31*st March*, 1836.

No. V.

TO THE HONOURABLE THE COURT OF DIRECTORS OF THE EAST-INDIA COMPANY.

The respectful Memorial of the Inhabitants of Madras, assembled at a Meeting held on the 26th of March, 1836.

YOUR Memorialists being very thoroughly impressed with the important advantages which would result to the state, to the mercantile community, and to the public at large, from the establishment of a regular and speedy communication between Britain and India, by means of steam navigation, have seen with much satisfaction that your Honourable Court have expressed an opinion, that such communication " would open the way to other improvements, and would ultimately redound to the benefit of both countries* ;" and have stated that, if the finances of India were in a flourishing condition, you might consider it a *duty* to incur even the enormous outlay which you calculated would be necessary for its accomplishment: and that while you hesitated, on account of the magnitude of the estimated cost, to engage immediately in any project of this character, you directed inquiries to be carried on to ascertain the practicability of effecting the end in view at a reasonable expense.

Since your Honourable Court expressed the above sentiments, the Select Committee, appointed by the House of Commons † to inquire into the means of promoting communication with India by steam, have submitted to the House resolutions declaring the opinion of the Committee, that the net charge of effecting this object, which is recognised as of great importance both to Great Britain and to India, should be divided equally between his Majesty's Government and the East India Company ; and that by proper management, the expense which has attended the experiments hitherto made may be materially reduced.

Your Memorialists have therefore been encouraged to make inquiries into the practicability of establishing steam communication at a more reasonable expense than was calculated by your Honourable Court, upon the estimates you had before you in 1832: and having compared those estimates with the probable costs at present, and calculated the probable returns from postage and passengers, the results, as exhibited in the Appendix to this Memorial, are so favourable, that they are induced to submit them to your Honourable Court, with a confident expectation that they will satisfy you, that the net expense of the establishment of steam communication, divided between his Majesty's Government and the East India Company, will impose a burden upon the finances of India far less than you anticipated, and inconsiderable when compared with the advantages which it is calculated to produce—advantages which the late Governor General thought would be cheaply bought at any price.

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* To Bombay Government, 14th March, 1832.

† Dated 14th July, 1834.

In this expectation, your Memorialists earnestly pray that your Honourable Court will, in concert with his Majesty's Government, take efficient measures for the complete establishment of steam communication between Britain and India, by monthly packets to and from the Red Sea, to be in connection with the line of packets between Falmouth and Alexandria. And your Memorialists venture to suggest that from its central position, and other circumstances, the port of Galle, in the island of Ceylon, is the fittest place to be fixed as the point of arrival and departure for the steam packets in India, and that Suez is the fittest place in the Red Sea.

No. VI.

MADRAS STEAM MEETING.

The following Resolutions, having been adopted by the Committee for submission to the Meeting convened by the Sheriff, are published for general Information:—

Resolved, I. That it is the opinion of this meeting, that nothing will so materially tend to develope the resources of India, to improve her people, to advance her general welfare, and to maintain the integrity of the empire, as being brought into the closest possible contact with Britain.

II. That it appears no effectual measures have yet been taken for the regular establishment of steam communication to and from India by the Red Sea, notwithstanding the resolutions of the Select Committee of the House of Commons, of the 14th July, 1834; viz.—

> IV. Resolved, That it is the opinion of this Committee, that the experiments which have been made, have been attended with very great expense; but that from the evidence before the Committee, it appears that by proper arrangements the expense may be materially reduced; and under that impression, it is expedient that measures should be immediately taken for the regular establishment of steam communication from India by the Red Sea.
>
> V. Resolved, That it is the opinion of this Committee, that it be left to his Majesty's Government, in conjunction with the East India Company, to consider whether the communication should be in the first instance, from Bombay, or from Calcutta, or according to the combined plan suggested by the Bengal Steam Committee.
>
> VI. Resolved, That it is the opinion of this Committee that by whatever line the communication be established, the net charge of the establishment should be divided

equally between his Majesty's Government and the East India Company, including in that charge the expense of the land conveyance from the Euphrates on the one hand, and the Red Sea on the other, to the Mediterranean.

III. That it is the opinion of this meeting, that the expectations expressed in the fourth resolution of the Select Committee of the House of Commons has been justified; inasmuch as it is now ascertained, that, owing to the low price of coals in India (which is likely to continue), the reduction in the expenditure of fuel, and other advantages resulting from improvements in steam machinery, the expenses of steam communication between England and India will fall far below the estimates which were framed in 1834.

V. That it is the opinion of this meeting that Point de Galle, in the island of Ceylon, is the most eligible place for the arrival and departure of steam-vessels to and from the Red Sea; as, independently of its central position, the voyage between that port and the Red Sea is more practicable throughout the year, than between the Red Sea and any other port in India.

VI. That in the opinion of the meeting the projected establishment of a company for carrying on a communication by steam, between Marseilles, Genoa, Naples, and Alexandria, in conjunction with the railroad, which is stated to be in progress between Cairo and Suez, cannot fail to create an active commercial intercourse between Continental Europe and India; and to afford a quick, easy, and economical conveyance for passengers between the two countries, which will enhance the importance, and eventually diminish the charge of completing the steam communication between Suez and India.

VII. That it is expedient to forward petitions to both Houses of Parliament, and memorials to the President of the India Board, and to the Honourable the Court of Directors, embodying the resolutions of this meeting, and praying that the resolutions of the Select Committee of the House of Commons may be carried into effect.

VIII. That the petitions and memorials now read be adopted, and that the Chairman be requested to forward the same; the memorial to the Honourable Court, through the Governor in Council, with an earnest application that he will be pleased to recommend the same in the strongest manner to their favourable consideration.

IX. That the Chairman be requested to convey the thanks of the meeting to the Right Honourable Lord Glenelg for his powerful support of steam communication between England and India, in 1834, with a request that his Lordship will be pleased to present and support the petition to the House of Lords; and that the petition to the House of Commons be transmitted to W. Crawford Esq., M. P. for the city of London, with a similar request.

X. That Captain Grindlay be appointed the agent in London, for forwarding the object of this meeting, and that a committee be appointed to draw up and forward the necessary instructions for his guidance.

XI. That the meeting view with much satisfaction the active exertions of Mr. Thomas Waghorn, in establishing himself in Egypt, for the purpose of facilitating the transit of passengers, parcels, and letters between Suez and Alexandria, and earnestly recommend his establishment to the favourable consideration of the Indian public.

No. VII.

THE MADRAS STEAM PETITION,

To be presented by W. Crawford, Esq. M.P. for London.

To the Honourable the Commons of Great Britain and Ireland, in Parliament assembled.

The humble Petition of the several Persons whose Names are hereunto subscribed, being Inhabitants of Madras, in the East Indies,

Sheweth,—That the British population of this part of India have been for a long time impressed with the conviction that nothing will tend so materially to develope the resources of India, to improve her people, to advance her general welfare, and to secure to the crown of the United Kingdom of Great Britain and Ireland the integrity of its empire over India, as the rapid and continued intercourse between the two countries by means of steam.

That this impression has not suddenly arisen, but has been one of gradual and steadily increasing growth, in which the native population has, during these latter years, participated; that the sincerity of this impression, British and native, has been proved by the large voluntary subscriptions which have from time to time been made, whenever a prospect for accomplishing this great object presented itself.

That the Governments in India, no less than the people, have been anxiously desirous for the establishment of steam communication between the two countries; and that Lord William Bentinck, the Governor-General, both individually and in council, zealously supported the project in 1833, and subsequently declared, " that its advantages were so great in all its direct and indirect consequences, that in his opinion it would be cheaply bought at any price."

That the public of this presidency have read with feelings of unmixed satisfaction, the resolutions which were passed by the Select Committee of your Honourable House in 1834, with regard to steam communication between England and India; but they regret that no effectual measures have yet been taken for its regular establishment in conformity with such resolutions.

That your petitioners, under the impression that the delay in carrying into effect the said resolutions has arisen from the large outlay which the undertaking was calculated to involve, have applied themselves to an examination of the estimates which were submitted to the Committee of your Honourable House, and find that the price of coals in India, therein mentioned, is greatly over-rated, inasmuch as they are stated to be from eighty to one hundred and forty shillings per ton, whereas the price of coals has been at Madras, during the past five years, upon an average less than thirty shillings per ton, and this price, your petitioners are assured, is more likely to fall than to rise.

That your petitioners submit, that owing to the reduction in the consumption of fuel, and other advantages resulting from improvements in steam machinery, there are solid grounds for believing that, by proper arrangments, the expense attending the establishment of periodical steam communication may be reduced greatly below the estimates, with reference to which the resolutions of the Select Committee of your Honourable House were framed.

That, with a view of covering a portion of that expense, your petitioners submit that it will be proper, so soon as monthly steam-packets shall be established, that legislative enactments should be passed, prohibiting, subject to certain necessary limitations for the purposes of trade, the transmission of letters, or parcels, below a certain weight, by any other conveyance than those packets.

That your petitioners believe that Point de Galle, in the island of Ceylon, is the most eligible place for the arrival and departure of steam-vessels to and from the Red Sea; as, independently of its central position, a voyage between that port and the Red Sea is more practicable throughout the year, than between the Red Sea and any other port in India; but your petitioners, with the greatest confidence, submit all details to the wisdom of your Honourable House, his Majesty's Ministers, and the East India Company, confining themselves to the humble but earnest prayer, that your Honourable House will be pleased to adopt such measures as may seem requisite for carrying into effect the said resolutions of the Select Committee of your Honourable House.

No. VIII.

REPLY OF THE BENGAL COMMITTEE TO MAJOR HEAD, CHAIRMAN OF THE PROVINCIAL COMMITTEE FOR ESTABLISHING A STEAM COMMUNICATION BETWEEN ENGLAND AND INDIA BY WAY OF THE RED SEA.

SIR,

I have the honour, by direction of the Committee of the new Bengal Steam Fund, to acknowledge the receipt of your letters under date 20th August last, with enclosures, and to communicate their sentiments as follows :—

1. In considering the question of a steam communication between England and India, the first thing to be dertermined is the object sought to be obtained by such a communication ; whether a mere intercourse of correspondence, or one embracing all possible advantages. To the first this Committee will not address themselves, believing that no person can be found who would contend for such restriction. As to the second, they may sum up their sentiments shortly by declaring that they concur entirely with Mr. Peacock in his memorandum delivered to the Select Committee of the House of Commons, and dated 2nd December, 1833, viz., that "between doing it efficiently and not doing it at all there seems to be no advisable medium."

2. With these sentiments, this Committee regret they cannot concur in the plan laid down by your Committee, as it would assuredly be incomplete, and therefore inefficient ; they consider that no plan can be efficient which does not embrace the whole communication from England to Calcutta, thereby including every part of India, dropping the mails and passengers in its progress, whether at Gibraltar, Malta, Alexandria, Bombay (from Socotra), Galle, Madras, and so on to Calcutta, proceeding the whole way with the utmost despatch.

3. If this despatch is impracticable—and it certainly is so—if, as you declare, it is indispensable that the communication from India should be delayed at Malta, that the packets and parcels from India should be subjected to fumigation, &c., and the passengers to quarantine in order that the Falmouth packet may be kept in free pratique instead of proceeding on with uninterrupted despatch throughout the whole line,—the consequent delay

and inconvenience will render a communication by steam round the Cape of Good Hope far preferable for every description of intercourse, except correspondence: nor, as regards Calcutta, by far the most important point in India, and Madras, would even correspondence itself be much expedited.

4. But it is not on this point alone that the Committee consider your plan imperfect and incomplete. You propose to have a company with 4,000 shares, at 100*l.* per share, but only to call for half at present, for the purpose, as it would seem, of first establishing the communication monthly to Bombay, reserving the remainder, not positively, to extend the communication to all parts of India, but only "on the reasonable expectation that the undertaking will eventually embrace a wider range, by extending the communication to Ceylon, Madras, and Calcutta."

5. Either by limiting the communication in the first instance to Bombay, it must be designed to benefit all India beyond the conveyance of mere correspondence, or to confine the benefit of the communication to mere correspondence. If the former, the Committee apprehend that the design must fail; for it would be incomparably more convenient to land the passengers and parcels from India for Great Britain at Penzance, or even on the Scilly Islands, than those of Great Britain for all India at Bombay. If the intention of benefiting all India beyond the mere conveyance of correspondence is not entertained, the Committee are apprehensive that the sources of return profits would be found lamentably deficient.

6. Again, you either do, or you do not, positively intend to extend the communication eventually. If you do not, and only propose to do it contingently, the

Committee would wish to know on what contingencies the extension is to depend. If it is to depend upon whether the communication to Bombay alone pays, and that if due returns are made on your capital you will content yourselves with that communication, in that case the Committee regret they cannot concur in your views; for, as before observed, if from whatever contingency the communication should not be extended to Calcutta, it would place all passengers and parcels, and every thing short of mere correspondence connected with Bengal and Madras, in a much worse situation than the passengers and parcels of Great Britain would be by St. Mary's being made the sole point of communication at home. If, on the other hand, it is positively intended eventually to bring on the communication to all the ports of India, it is the opinion of this Committee that the extended scheme should be carried into effect at once, and that a steamer should run from Suez the whole way to Calcutta, touching at Galle and Madras, with a separate one branching off at Socotra to Bombay. You propose to have four steamers to go between Bombay and Suez, starting on the 1st of every month; but you are probably not aware that it has been stated positively at Bombay, particularly by Captain Wilson, who for a long time commanded the Hugh Lindsay while employed on the Red Sea voyages, that during four months the strength of the monsoon operates so as, if not to prevent the communication, at least to render it useless: but four steamers would be sufficient to make a monthly communication from Calcutta to Suez, and two of smaller size would be enough between Bombay and Socotra, or Bombay and Galle, during those months when the passage direct from Bombay is impracticable: so that with only two additional steamers of smaller dimensions you might establish your main trunk the whole way to Calcutta, touching at Galle and Madras, and have your branch to Bombay.

7. By this course you would embrace every point from which you could expect returns, without which it is scarcely possible that any scheme can pay. You cannot fail to see that the same expense is necessary to bring the communication to Socotra, whether you go to Bombay alone or to all India; while by the former course you are excluded from by far the greater sources of profit.

8. There is one other point to which the Committee would refer. In your outline of the plan submitted to Government and the East India Company you say "The transit from Alexandria to Suez to be undertaken by the Company." The Committee do not exactly understand whether the East India Company is meant, or the Company to be formed for the establishment of the communication. If the former, this Committee consider that it would essentially injure and derange the scheme, even though it were in every other respect perfect. The establishment of a perfect and complete communication between England and all parts of India by steam through the Red Sea would very soon divert into this channel every package and parcel that could be conveyed by this route, including especially small parcels of value, periodical works, and all portable articles subject to deterioration by a long sea voyage. If the agency charged with the conveyance should be changed in the course of the transit at Suez and Alexandria, delay would necessarily take place consequent on the examination and exchange of receipts; and under the consequent divided responsibility, if a parcel was lost, there would be great difficulty in fixing the

responsibility; this Committee have always considered that the communication should be carried on throughout under one agency and reponsibility. As, in London, an individual can take a place or send a parcel to Paris, subject to the responsibility alone of the proprietors of the office in London, so an individual in India to England should be enabled to "book himself," or send his parcel, through the whole line, under one single agency; and if the "transit from Alexandria to Suez" is to be undertaken by the company to be formed for bringing the communication to bear, the Committee would wish to know whether the "undertaking" embraces the transit of passengers and parcels; in a word, of all persons and things that may have been "booked for the whole passage."

9. The Calcutta Committee have thus frankly expressed their sentiments. Their views have all along been directed to obtain the most complete communication: they hold that this is precisely one of those projects which can alone work out the advantages derivable from it by its being carried into effect on the most efficient scale. They consider that it should be altogether independent of the Malta mail, if, by a connection with that mail delay or obstacles occur; that the steamer should go direct from Alexandria to England, and there, if necessary, be subjected to quarantine; which, owing to the longer period of her absence from the suspected port, would be of shorter duration than at Malta; and, after the most mature consideration for the period of two years, during which they have examined the subject in all its bearings, they must avow their decided opinion to be, that without this continuous and uninterrupted course, and that held with the utmost despatch, the communication by way of the Red Sea will be found

inefficient from any part of India, and for Calcutta and Madras nearly useless.

	Rs.
Calcutta,	3,79,49,681
Madras,	59,10,042
Ceylon,	18,88,007
	4,57,47,730

	Recd.		Despd.
Calcutta,	89,189	...	72,397
Madras,	31,306	...	40,614
Ceylon,	6,000	...	6,505
	1,26,495	...	119,516
	1,19,576		
	2,46,011		

	Arrivals.		Departures.
Calcutta,	767	...	665
Madras,	573	...	459
Ceylon,	85	...	17
	1,425	...	1,141
	1,141		
	2,566		

10. Besides soliciting your attention to the accompanying notes, this committee would refer you to the Memorial of the Inhabitants of Calcutta and its neighbourhood, from which you will perceive that the united annual average of the commerce with Europe, of Calcutta, Madras, and Ceylon, even prior to the abolition of the right of the Honourable Company to trade, was Rs. 4,57,47,730, while that of Bombay was only Rs. 1,63,89,629; that the number of letters received at, and despatched from, Calcutta, Madras, and Ceylon, amounted to 2,46,011, while those of Bombay were only 54,000; that the annual number of passengers arriving at, and leaving Calcutta, Madras, and Ceylon, from and to Europe, was 2,566, at Bombay only 603.

11. The Committee are quite aware that out of the united number of letters received at and despatched from Calcutta and Madras, amounting 233,506, the

greater portion would, even under the comprehensive scheme, pass through Bombay, but those for the towns of Calcutta and Madras would be passed direct to those places. The average number of letters put into the post-office at Calcutta is 47,344; of these some undoubtedly are from the country, sent under cover to agents in Calcutta; but besides this number, it is estimated that about 6,080 letters are despatched in the private bags of vessels, which letters do not pass through the post-office. The letters therefore from Calcutta alone, allowing 3,000 of those put into the post-office at Calcutta to be from the country, may be fairly taken at 50,000. But the Committee are quite willing to allow that for the sake of merely gaining a few days for this, or even double the number of mere letters of ordinary intercourse, it would be scarcely advisable to seek the extension; yet when it is remembered that in that number is included correspondence, connected with annual commercial transactions to the extentof near four millions sterling, that such extensive commercial transactions require the most enlarged means of correspondence, including the transmission of accounts, invoices, &c. the difficulties and expense of the conveyance of which must prevent their being sent by Bombay,—when, again, the number of passengers passing between Europe and Calcutta, Madras and Galle, is considered in comparison with those from Bombay, viz. 2,566 to 603, that in the former number is included the individuals conducting commercial transactions to the extent, even prior to the abolition of the trade of the Honourable Company, of above 4½ millions, and that landing such passengers at Bombay is worse than landing passengers for Great Britain on the Scilly Islands, the Committee do consider confining for any period whatever the communication to Bombay altogether inefficient, and that it would produce little comparative advantage, though its cost would be great.

12. Although unable, for the reasons assigned, to concur in the plan projected by your Committee, yet this Committee duly appreciate the assistance afforded to the cause by your labours and exertions in bringing the question so prominently forward, and in pressing it so strongly on the consideration of his Majesty's Government and of the East India Company.

13. The Committee are quite satisfied, let the result be what it may as regards your own immediate project, that your proceedings have formed one great and powerful link in the chain of events leading to the final establishment of the communication, and that you are therefore justly entitled to the thanks of the people of India, and of all who are interested in the success of this important measure.

14. The Committee are fearful that they may be considered to have extended this communication beyond reasonable bounds; but they are desirous of showing that their non-concurrence in your plan is founded on well-grounded considerations. They will, however, cause your despatch to be published in the papers of this presidency, together with this reply.

I have the honour to be, Sir,
Your most obedient servant,
C. B. GREENLAW

Town Hall, Calcutta, Dec. 26, 1836.

APPENDIX (C.)

ON THE STEAM NAVIGATION OF THE GANGES.

On the arrival of Lord William Bentinck in India in 1828, his attention was forcibly arrested by the advantage of establishing inland steam navigation on the Ganges. It was apparent, that by such means the most distant provinces of Bengal and Agra, including all the principal commercial and military stations of the two presidencies on the banks of that river, would be for all the purposes of government and commerce united with the seat of supreme government and the centre of Indian trade. The difficulty of combining in river steamers the apparently incompatible qualities of large capacity for cargo and passengers, sufficient power of engines, and extreme lightness of draught, was surmounted by Messrs. Maudsley and Field, who constructed two iron boats for this purpose: one a tug-boat fitted with their oscillating engines, and another, a boat for passengers and cargo, capable of accommodating a large number of passengers with about 45 tons of cargo. Four pairs of these boats were sent in pieces to Calcutta by order of the Court of Directors of the East India Company. The first pair was put together, and began to ply between Calcutta and Allahabad in the end of August, 1834, and the last pair was launched in January, 1836. These boats had, in April. 1836, made altogether eighteen voyages, upon each of which they were well supplied with freight and passengers. The demand for freight for goods up to last April had greatly exceeded the limited means of meeting it; and upon every occasion of the despatch of a boat many tons of cargo were rejected for want of space, to the great injury and annoyance of the native merchants. Notwithstanding the unavoidably heavy charge for freight (sixty rupees per measured ton), the shippers are more than compensated by the diminished rate of insurance and quick return. The demand for passage also exceeds the means of meeting it at that season of the year when families from the remotest stations between the Bengal and Agra territories come to the banks of the Ganges for the advantage of water-carriage to Calcutta.

Those persons also who arrive at Calcutta, intending to proceed to the upper provinces, find the advantage of this mode of speedy conveyance to the respective stations, which enables them to perform in three weeks, a journey which before the establishment of these boats occupied as many months. There is no class of persons, however, who feel more sensibly the advantage of this improved mode of communication than the booksellers and publishers: the periodicals of Europe and America being dispersed at a quick and cheap rate by these means over the greater part of India.

The existing demand for the tonnage in the steam-boats at the present prices would scarcely be satisfied even by a weekly despatch; and the four iron boats, whose monthly voyages on the Ganges have hitherto been bounded by the confluence of that river with the Jumna, can only be considered as the nucleus of a more extensive establishment, whose operations will be extended wherever water will be found for inland communication, and which will carry commerce to the remotest points of the empire.

APPENDIX (D.)

ON THE ISLAND OF SOCOTRA.

THE island of Socotra is situate in the Indian Ocean, east of the African cape Guardafui which bounds the mouth of the gulph of Aden.

The chief town of the island is situate in lat. 12° 39′ N. long. 54° 6′ 30 E.

Notwithstanding the considerable importance which the island receives from its geographical position, standing as it does in the direct route of the commerce from whatever quarter with the Red Sea, as well as in the road of our ships bound to or from the Cape, it was not until the year 1834 that any satisfactory information was obtained respecting it. In that year a survey of the island was made under the direction of Captain Haines, of the Honourable Company's ship Palinurus, and Lieut. Wellsted. The latter gentleman in the following year presented to the royal Geographical Society a detailed account of the island, which was published in their journal, and to which I am indebted for the following particulars respecting it.

The island consists of a narrow strip of land, stretching east and west, in extreme length about 75 miles, in width 20 miles.

The southern coast is convex, and preserves nearly an unbroken line; the northern shore is irregularly concave, and is broken into a succession of small bays, the western shores being also irregularly indented.

The whole island consists of elevated ground or table land, surrounded by a low plane extending to the margin of the sea, varying in width from two to four miles. This low belt of ground is not susceptible of any considerable degree of cultivation ; the high land, however, exhibits a great variety of soil and surface.

As a general remark, it may be observed that nothing can present a stronger contrast than the opposite ends of the island during the north-east monsoon. While the eastern end is destitute of verdure, affords but scanty pasturage, and has no other water than what is retained in natural reservoirs, the western end is supplied with frequent streams, its valleys, and plains are clothed with luxuriant verdure and covered with herds of cattle, and the scenery is in many places equal to the best of our own country

On the summits of the hills on the northern side of the island, and against the sides and elevated regions of the granite peaks, a dark and rich mould is found, which nourishes a thick and luxuriant vegetation. In the plains around some of the villages are many beautiful valleys, the soil being a reddish-coloured earth, which nourishes at certain seasons an abundant supply of grass, and is well adapted for the cultivation of grain, fruit, and vegetables. In the valleys through which the streams flow, there are not only extensive groves of dates, but the fertility of the soil is manifested by a broad border of most beautiful turf, occasional inclosures of dukkun. and plantations of indigo and cotton.

Though Socotra is situate only a short distance from the continents of Africa and Arabia, and is in the same latitude with their most parched and burning plains, yet it enjoys comparatively a remarkably temperate and cool climate ; an effect which perhaps may be ascribed to the vast expanse of water over which both monsoons blow before they pass it. A register of the thermometer kept in the north-east monsoon proves the average temperature to be 70½°, while several streams at but a short distance from the level of the sea indicate a mean temperature of 74°. On the hills it is still cooler, and the great elevation of the granite mountains would enable settlers to choose their own climate.

Socotra enjoys frequent and copious rains, the dry season being much shorter than in the countries of Asia and Africa. The lofty peaks of the granite mountains attract the clouds, which deposit their aqueous particles to feed the mountain streams or be precipitated in plentiful showers over the country.

During the south-west monsoon, the average temperature is much higher than the above; but in certain parts of the island on the windward side, the summits of the mountains and the open parts of the coast are delightfully cool.

The most important natural production of Socotra is the aloe, for which the island has been celebrated from the earliest period. This plant grows spontaneously on the limestone mountains, from 500 to 3,000 feet above the level of the sea. The produce is brought to Tamarida and Colliseah, the principal towns and harbours for exportation.

In 1833, the best quality of aloes sold for one rupee a pound, while for the more indifferent the price per pound was thirteen pence. The Socotran aloes are considered the finest in the world, but the value is impaired by the careless manner in which they are gathered and packed.

The dragon's blood tree is the article next in importance to the aloe, and like it is usually met with on the hills, at the elevation of 800 to 2,000 feet above the level of the sea. There are two kinds on the island the best of which is of a dark crimson colour, and its price at Muscat varies from six to eight rupees a pound. There are other trees on the island, from which inferior gums are obtained. The date, the tamarind, and the brah are also common.

Agriculture is almost unknown, the only grain cultivated in the island being a species of millet, called dukkun, which receives a preference chiefly because it requires little attendance, and will produce a crop at any season. Beans, tobacco, and yams are also occasionally cultivated.

The pasturage of the island supports camels, oxen, sheep, goats, and asses. Cows are very numerous near Tamarida, and resemble the Alderney breed, but their magnitude does not exceed that of Welsh cattle. Having abundant pasturage they are sleek and fat, and their flesh, when young, is of a very superior quality. Vast flocks of sheep and goats are found in every part of the island; the latter being so numerous that their owners keep no account of them.

Socotra was at a very early period dependent on the kings of the incense country, whom the Portuguese navigators found in the undisturbed possession of it. When Albuquerque conquered the island, he vested the government in the hands of some of his officers; but their sway was short, and Socotra again fell into the hands of its ancient possessors. From this period until the last half century, a brother, or some near relation, of the sultan of Kisseen, on the Arabian coast, resided constantly upon it as its governor. But it is now subjected merely to an annual visit from such a personage. His sway is also disputed, for during the visit of Lieutenant Wellsted, Hamed-ben-Tary, another chief arrived and, under threat of burning the town, succeeded at Colleseah, in procuring about 30 dollars' worth of ghee; he also forbade camels or guides to be supplied to the Company's officers.

On the suggestion being made to the natives of the probability of the island passing into the hands of the British, they manifested no discontent; but, on the contrary, expressed a hope that they should then have some settled government.

The male inhabitants of the island are usually tall, strong, and muscular, with remarkably well-formed limbs, European features, aquiline nose, expressive eyes, and good teeth and mouth. Their hair, which is long and naturally curled, has no approach to the woolly or crisp texture. They wear beard and whiskers, but not mustachios. Their dress consists of a piece of cloth, wrapped round the waist, the end thrown over the shoulders: their skins are clear, and remarkably free from any eruption or cutaneous disorder.

Nearly the same observations may be applied to the persons and features of the women; their complexion is in general however, more fair, and their dress consists of a camaline, bound round the waist, by a leathern girdle, and a wrapper of cloth is thrown over the shoulders. Their ornaments are necklaces and ear-rings; they go unveiled and are freely approached.

The moral character of the Socotran Bedouins is good, and heinous crimes are extremely rare among them. They are a lively and generous race, remarkably distinguished for their hospitality, which has no other limit than their means.

There are few diseases prevalent in the island: a few cases of cancer and elephantiasis, and some indisposition produced by bad and insufficient diet, were observed; but in general the island is remarkably healthy.

APPENDIX (E.)

OF THE HEAD OF THE MALDIVES.

THE Maldives are a group of islands extending from the line to about 9° N. lat. and 74° E. long. The northernmost of this group, called Atoll-Heawandoo-Pholo, or Head of the Maldives, is situated between 7° 7′ and 6° 55′ north latitude, and is in the meridian of Bombay. It consists of twenty-four small islands and two sand banks, several small shoals, and two large barrier reefs; the latter extending from the boundary of the Atoll to the S. W. W. and N. W. The following particulars are obtained from a notice of these islands by Lieutenant J. Powell, Indian Navy, who made a survey of them:—

The northern or principle barrier has ten islands and two small islets on it; one of the latter on its southern extremity being close to Heawandoo: these are all situated on the inner side of the reef, having three or four, and in some places six fathoms water between them and its outer edge, with small channels for boats between each, formed by the natives having cleared away the coral rocks. Nearly in the centre of the Atoll there are three small islands. The eastern side is clear of shoals, with the exception of two small patches between Gullandoo and Mooradoo; but on the western, there are several nearly dry and some sunken patches, having from 3 to 10 fathoms on them. The soundings vary from 20 to 34 fathoms, the latter being the greatest depth of water obtained.

Population.—Of the twenty-two islands composing this Atoll there are only seven inhabited, viz. Heawandoo, Kooraforee, Katefooree, Turracoon, Collegaum, Beeramerdoo, and Mooradoo.

In the margin* I have noticed the number of inhabitants and boats upon each, by which it will be seen that the population, including men, women, and children, does not exceed 760 individuals. The boats are all employed in fishing: the trade between this Atoll and Tilla-Dow-Madow, whence they are supplied with such articles as they require, being carried on in those of the latter.

The islands are so similar in form and natural productions, that it would be a waste of time to describe them separately; I shall therefore give a sketch of Heawandoo, the island of greatest importance in this group, not so much on account of its size, as from its being the residence of the sultan's vizier when he visits the Atoll. It is of a triangular form, about one mile in length, and is composed of coral elevated about 12 feet above the level of the sea. The western side is thickly covered with cocoa-nut and bread-fruit trees; and the northern and eastern with thick brushwood: the interior, which is 3 or 4 feet lower than the sides, has been cleared by the inhabitants for the purpose of cultivating

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	Population.	No. of boats.
* Heawandoo,	150	6
Kooraforee,	160	5
Katefooree,	70	13
Turracoon,	50	2
Collegaum,	150	4
Beeramerdoo,	30	2
Mooradoo,	150	5

a small grain called bimbi. The supply, however, which, with the exception of a few sweet potatoes. pumpions, and limes, forming the only vegetable production of the island, is not sufficient for their support. The village, which consists of about 50 huts and 150 inhabitants, stands on the S. W. side. The huts, surrounded by spacious inclosures, are in general constructed of a framework of the wood of the cocoa-nut tree, the interstices filled up with leaves stitched together, and the roof neatly thatched with the same material. In the vicinity there are good paths intersecting the island in different directions, which being kept remarkably clean by the women, form pleasant walks, shaded from the sun by the thick foliage of the cocoa-nut and other trees. Like the natives of the other Atolls, they gain their livelihood by fishing. Cocoa-nuts, and the fish called by them Goom-le-Mus (Boneta) which are caught in great quantities, form their principal food: rice, being imported, is very scarce, and only procurable by the better class of inhabitants. Fresh water is plentiful, wells having been dug in almost every quarter of the island; but the best is procured from those situated in the burying-ground. Fowls are abundant on all the islands, but not easily procured, being remarkably wild, and difficult to catch, and the natives too indolent to take the trouble necessary to secure them. Money, for which they have little use, will not fetch its full value; rice, tobacco, and betel-nuts being the best medium of barter.

WEATHER.

October.—The winds moderate and variable from W. S. W. to N. with cool pleasant weather, and occasional hard squalls, accompanied by heavy showers of rain.

November.—Light breezes from N.N.E. to N.N.W. and occasional squalls from the eastward until the 22nd, when dark, cloudy, tempestuous weather, and incessant rain set in from the W. N. W. On the 27th it cleared up and continued fine for the remainder of the month.

December.—Moderate breezes generally from E.N.E. with pleasant clear weather, occasionally from E.S.E. with squalls and rain.

During these three months the mean temperature of the atmosphere ranged from 80° to 84° frequently decreasing in the squalls to 78°.

The tides are extremely irregular, and at all times influenced by the prevailing winds and currents.

During the strong westerly breezes, the flood set to the eastward, and continued to run for the greatest part of the day; but when they moderated, the ebb in like manner, set to the westward, the weather falling 6 or 7 inches lower than I had ever seen it before, even on the springs.

In moderate weather, when the tides flow with somewhat greater regularity, the ebb always runs an hour and a half longer than the flood.

The rise and fall of water is then about five feet, and the velocity about a mile and a half per hour.

In October, November, and December, the current to the westward of the Atoll set to the southward, at the rate of 36 miles per day. The natives say that it commences about the middle of September, and continues to the end of December, when the easterly winds set in, then turns to the westward, and runs in that direction until April.

Of this group, I conceive Heawandoo Island is better adapted than any other for a coal depôt: it lies nearly in a direct line between Point de Galle and Socotra, at about one-third of the whole distance from the former place, it is easy of access in every direction, and possesses safe anchorages for ships and steamers in all seasons. During the S. W. monsoon, a vessel could anchor on the east side of the island, between it and a small reef, dry at low water. In the N. E. monsoon the best anchorage is in the channel, between the island and the south barrier reef in 16 or 17 fathoms, sand and rocks. Opposite both these anchorages there are good landing places for boats, which are procurable in sufficient numbers, and may easily be made available for the landing or shipment of coals, &c. The natives, who are civil and peaceable, might, I think, be induced to work for a small hire, such as rice, tobacco, &c., or any other remuneration they might consider adequate.

In approaching Heawandoo-Pholo-Atoll, from the eastward, a vessel ought to sight Kilah, the northernmost island of the Tilla-Doo-Mattee-Atoll and then steer across the channel to Heawandoo Island, passing close to Gullandoo, to avoid the small patches between it and Mooradoo.